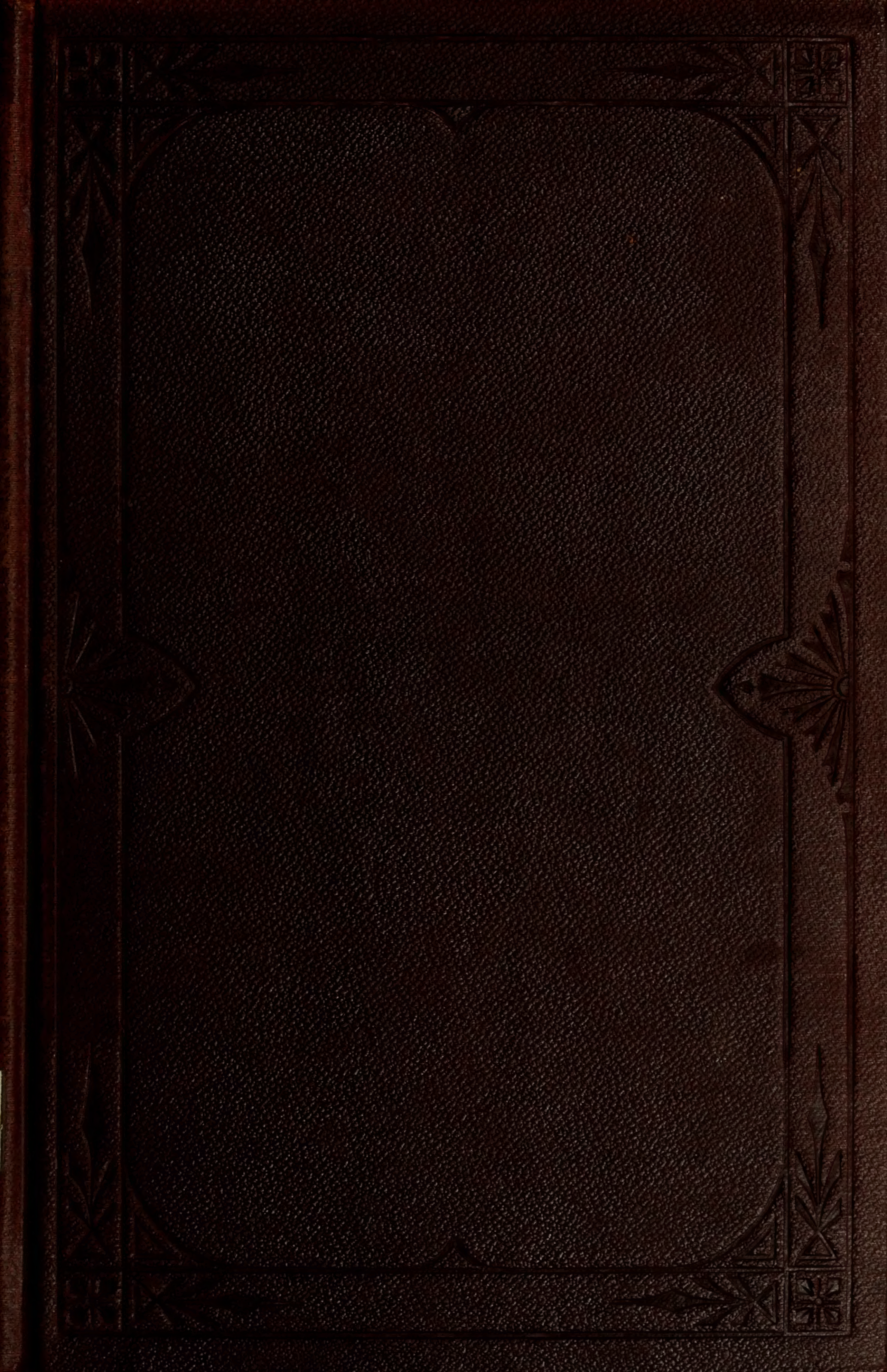

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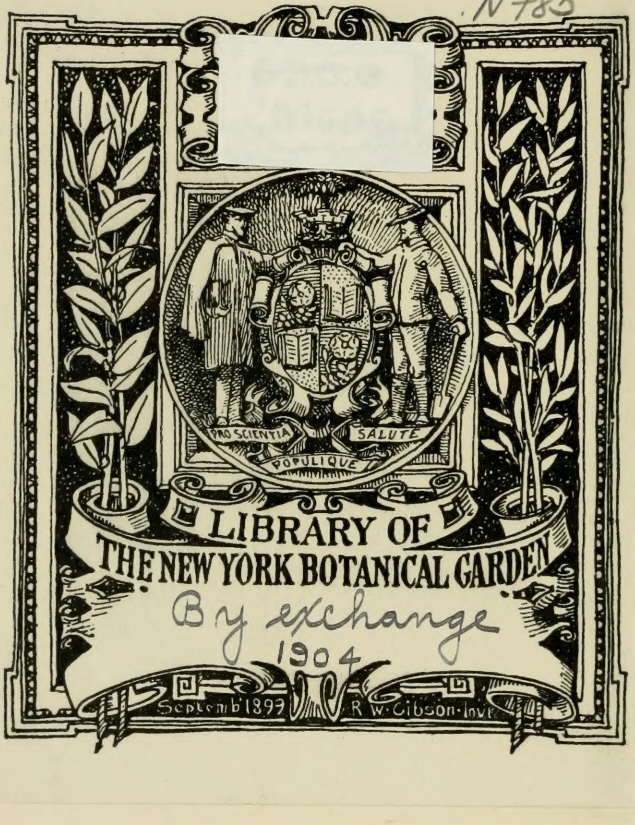

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36TH ANNUAL REPORT

OF THE

State Horticultural Society

OF MISSOURI

1893.

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MEETINGS AT

COLUMBIA, JUNE 6, 7, 8, AND FULTON, DEC. 6, 7, 8, 1893.

L. A. GOODMAN,
Secretary, Westport, Mo.

JEFFERSON CITY, MO.:
TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS.
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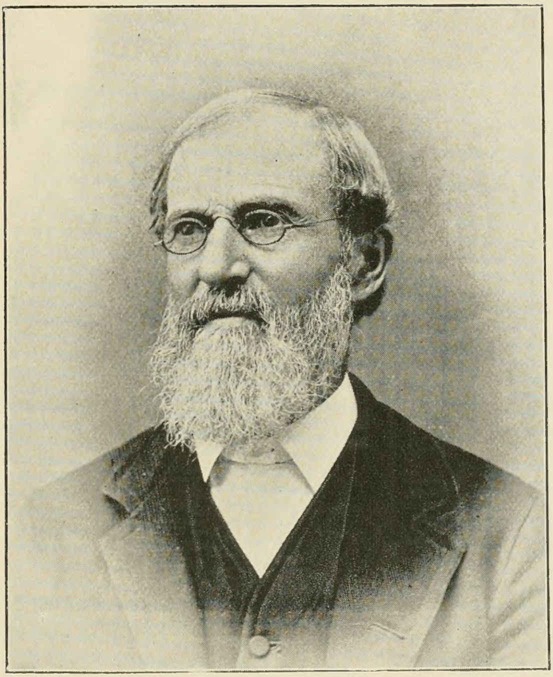

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MISSOURI STATE HORTICULTURAL SOCIETY.

To His Excellency, William J. Stone:

This report of our society work, of the meetings held, of the moneys expended, and of the local societies and counties reporting for the year 1893, is respectfully submitted.

L. A. Goodman, Secretary,
Westport, Mo.

City of Jefferson, January 31, 1894.

To the Commissioners of Public Printing:

I require for the use of my office 3500 copies of Missouri Horticultural Report—2000 bound in cloth and 1500 in paper—which I desire printed as per accompanying sample.

Respectfully,
L. A. Goodman, Secretary,
Westport, Mo.

Approved:
A. A. Lesueur, Secretary of State.
J. M. Seibert, State Auditor.
Lon V. Stephens, State Treasurer.

OFFICERS FOR THE YEAR 1894.

PRESIDENT,
J. C. EVANS, North Kansas City.

VICE-PRESIDENT,
N. F. MURRAY, Oregon.

SECOND VICE-PRESIDENT,
SAMUEL MILLER, Bluffton.

SECRETARY,
L. A. GOODMAN, Westport.

TREASURER,
A. NELSON, Lebanon.

LIST OF HONORARY MEMBERS.

Hon. A. A. Lesueur	Jefferson City
Miss M. E. Murtfeldt	Kirkwood, Mo
George Hussman	Napa, Cal
T. T. Lyon	South Haven, Mich.
C. W. Murtfeldt	Kirkwood, Mo
Hon. N. J. Colman	St. Louis, Mo
Samuel Miller	Bluffton, Mo
Herman Jaeger	Neosho, Mo
Prof. M. G. Kern	St. Louis, Mo

LIST OF LIFE MEMBERS.

Wm. Muir, Old member	Fox Creek
H. Claggett, ‘‘	Kansas City
J. C. Evans	North Kansas City, Mo.
L. A. Goodman	Westport, Mo
D. M. Dunlap	Fulton, Mo
D. A. Robnett	Columbia, Mo

STANDING COMMITTEES.

Orchards.

J. A. Durkes, Weston; Henry Speer, Butler; H. W. Jenkins, Boonville.

Vineyards.

H. Jaeger, Neosho; Jacob Rommel, Morrison; C. Teubner, Lexington.

Small Fruits.

G. W. Hopkins, Springfield; J. N. Menifee, Oregon; Henry Schnell, Glasgow.

Stone Fruits.

S. W. Gilbert, Thayer; Z. T. Russell, Carthage; H. D. McKay, Olden.

Vegetables.

Prof. J. C. Whitten, St. Louis; C. M. Williams, Marceline; A. J. Davis, Jefferson City.

Flowers.

E. H. Michel, St. Louis; Mrs. G. E. Dugan, Sedalia; C. I. Robards, Butler.

Ornamentals.

F. A. Hubbard, Carthage; F. McCoun, St. Joseph; R. E. Bailey, Fulton.

Entomology.

Miss M. E. Murtfeldt, Kirkwood; J. L. Snodgrass, West Plains; G. F. Luckhardt, Oregon.

Botany.

Prof. G. C. Broadhead, Columbia; B. F. Bush, Independence; J. Kirchgraber, Springfield.

Nomenclature.

W. G. Gano, Parkville; E. L. Pollard, Olden; A. Ambrose, Nevada.

New Fruits.

J. B. Wild, Sarcoxie; A. H. Gilkeson, Warrensburg; J. F. Wilcox, St. Joseph.

Ornithology.

Prof. L. T. Kirk, Sedalia; C. W. Murtfeldt, Kirkwood; C. Howard, Willow Springs.

Injurious Fungi.

Prof. C. A. Keffer, Columbia; Prof. W. Trelease, St. Louis.

Packing and Marketing Fruits.

E. T. Hollister, St Louis; C. C. Bell, Boonville; C. Thorp, Weston.

Transportation.

J. M. Rice, Sarcoxie; C. C. Bell, Boonville; L. A. Goodman, Westport.

INCORPORATION AND REORGANIZATION

Of the Horticultural Society by an act of the General Assembly in 1893.

The following law was passed by the last Legislature incorporating the State Horticultural Society. The Executive Committee met soon after the passage of this act and accepted its provisions, and at the semi-annual meeting of the Society at Columbia June 6–7–8, 1893, the act was adopted as part of the constitution of the Society.

MEMBERSHIP.

Under the new constitution the law requires the payment of $1 per year for membership fee. We hope that we shall have a good long list of members under our new plan for business. The plan under which we have been working, of giving each local society the privilege of paying their fee into their local society, thus making them a member of the State Society, cannot now avail. Each person must become a member of the State Society and keep up his membership each year.

We should like to see a good number of life members also; it is very desirable.

L. A. GOODMAN, Sec'y.

ACT OF THE GENERAL ASSEMBLY.

The Missouri State Horticultural Society is hereby instituted and created a body corporate, to be named and styled as above, and shall have perpetual succeasion, power to sue and be sued, complain and defend in all courts, and to make and use a common seal and alter the same at pleasure.

The Missouri State Horticultural Society shall be composed of such persons as take an interest in the advancement of horticulture in this State, who shall apply for membership and pay into the Society treasury the sum of one dollar per year, or ten dollars for a life membership, the basis for organization to be the Missouri State Horicultural Society, as now known and existing, and whose expenses have been borne and annual reports paid for by appropriations from the State treasury. The business of the Society, so far it relates to transactions with the State, shall be conducted by an executive board, to be composed of the President, Vice-President, Second Vice-President, Secretary and Treasurer, who shall be elected by ballot at an annual meeting of the Society; the Governor of the State shall be *ex officio* a member of the Board—all other business of the Society to be conducted as its by-laws may direct. All appropriations made by the State for the aid of the Society shall be expended by means of requisitions to be made by order of the Board on the State Auditor, signed by the President and Secretary and attested with the seal; and the Treasurer shall annually publish a detailed statement of the expenditures of the Board, covering all moneys received by it. The Public Printer shall annually, under the direction of the Board, print such number of reports of the proceedings of the Board, Society and auxiliary societies as may in the judgment of the State Printing Commission be justified by the appropriation made for that purpose by the General Assembly, such annual report not to contain more than four hundred pages. The Secretary of the Society shall receive a salary of eight hundred dollars per annum as full compensation for his services; all other officers shall serve without compensation, except that they may receive their actual expenses in attending meetings of the Board.

CONSTITUTION OF THE MISSOURI STATE HORTICULTURAL SOCIETY.

ARTICLE I. This association shall be known as the Missouri State Horticultural Society. Its object shall be the promotion of horticulture in all its branches.

ART. II. Any person may become a member of this society upon the payment of one dollar, and membership shall continue upon the payment of one dollar annually. The payment of ten dollars at any one time shall constitute a person a life member, and honorary members may be elected at any regular meeting of the society. And any lady may become a member by giving her name to the secretary.

ART. III. The officers of this society shall consist of a president, vice-president, second vice-president, a secretary and a treasurer, who shall be elected by ballot at each regular annual meeting, and whose terms of office shall begin on the first day of June following their election.

ART. IV. The elective officers of this society shall constitute an executive committee, at any meeting of which a majority of the members shall have power to transact business. The other duties of the officers shall be such as usually pertain to the same officers of similar organizations.

ART. V. The regular meetings of this society shall be held annually on the first Tuesday in December and June, except when otherwise ordered by the executive committee. Special meetings of the society may be called by the executive committee, and meetings of the committee by the president and secretary.

ART. VI. As soon after each regular annual meeting as possible, the president shall appoint the following standing committees, and they shall be required to give a report in writing, under their respective heads, at the annual and semi-annual meetings of the society, of what transpires during the year of interest to the society: Orchards, Vineyards, Stone Fruits, Small Fruits, Vegetables, Flowers Ornamentals, Entomology, Ornithology, Botany, Nomenclature, New Fruits, Injurious Fungi, Packing and Marketing Fruit, and Transportation.

ART. VII. The treasurer shall give a bond in twice the sum he is expected to handle, executed in trust to the president of this society (forfeiture to be made to the society), with two or more sureties, qualifying before a notary public, of their qualifications as bondsmen, as is provided by the statute concerning securities.

ART. VIII. This constitution may be amended by a two-thirds vote of the members present at any regular meeting.

LIST OF COUNTY SOCIETIES.

Adair County Horticultural Society—
R. M. Brasher, Pres't, Kirksville.
A. Patterson, Sec'y, Kirksville.

Atchison County Horticultural Society—
C. W. Coe, Pres't, Tarkio.
R. Lynn, Sec'y, Tarkio.

Barry County Horticultural Society—
H. C. Fitch, Pres't, Seligman.
G. G. James, Sec'y, Exeter.

Bates County Horticultural Society—
C. I. Robards, Pres't, Butler.
Henry Speer, Sec'y, Butler.

Barton County Horticultural Society—
C. H. Fink, Pres't, Lamar.
D. B. Hayes, Sec'y, Lamar.

Boone County Horticultural Society—
D. A. Robnett, Pres't, Columbia.
Thos. L. Beazley, Sec'y, Columbia.

Buchanan County Horticultural Society—
D. A. Turner, Pres't, St. Joseph.
F. McCoun, Sec'y, St. Joseph.

Butler County Horticultural Society—
D. C. Kitteridge, Pres't, Poplar Bluff.
E. R. Lentz, Sec'y, Poplar Bluff.

Crawford County Horticultural Society—
Conrad Martin, Pres't, Cuba.
W. S. McKinney, Sec'y, Cuba.

Camden County Horticultural Society—
J. W. Burhans, Pres't, Stoutland.
J. D. Reagan, Sec'y, Stoutland.

Central Missouri Horticultural Society—
H. W. Jenkins, Pres't, Boonville.
C. C. Bell, Sec'y, Boonville.

Callaway County Horticultural Society—
R. T. Murphy, Pres't, New Bloomfield.
R. E. Bailey, Sec'y, Fulton.

Conway Horticultural Society—
W. H Getty, Pres't, Conway.
R. O. Hardy, Rec. Sec'y, Conway.

Cole County Horticultural Society—
T. M. Barker, Pres't, Jefferson City.
A. J. Davis, Sec'y, Jefferson City.

Greene County Horticultural Society—
H. H. Parks, Pres't, Springfield.
G. W. Hopkins, Sec'y, Springfield.

Republic Horticultural Society—
T. W. Wade, Pres't, Republic.
R. C. Villes, Sec'y, Republic.

Henry County Horticultural Society—
M. L Bonham, Pres't, Clinton.
J. M. Pretzinger, Sec'y, Clinton.

Holt County Horticultural Society—
N. F. Murray, Pres't, Oregon.
S. Blanchard, Sec'y, Oregon.

Howell County Horticultural Society—
W. F. Benson, Pres't, Willow Springs.
C. Howard, Sec'y, Willow Springs.

Jasper County Horticultural Society—
S. S. Riley, Pres't, Carthage.
Z. T. Russell, Sec'y, Carthage.

Sarcoxie Horticultural Society—
J. H. Foster, Pres't, Sarcoxie.
H. Adkins, Sec'y, Sarcoxie.

Lafayette County Horticultural Society—
Dr W. A. Gordon, Pres't, Lexington.
C. Tuebner, Sec'y, Lexington.

Laclede County Horticultural Society—
A. Nelson, Pres't, Lebanon
E. B. Kellerman, Sec'y, Lebanon.

Lawrence County Horticultural Society—
J. B. Logan, Pres't, Marionville.
B. Logan, Sec'y, Marionville

Linn County Horticultural Society—
Ralph Smith, Pres't, Brookfield.
J. Gamble, Sec'y, Brookfield.

Livingston County Horticultural Society—
J. A. Love, Pres't, Chillicothe.
W. E. Lilly, Sec'y, Chillicothe.

Mound City Horticultural Society—
D. B. Browning, Pres't, Mound City.
J. M. Hasness, Sec'y, Mound City.

Mercer County Horticultural Society—
H. R. Wayman, Pres't, Princeton.
J. A. Kennedy, Sec'y, Ravenna.

Madison County Horticultural Society—
A. A. Blumer, Pres't, Fredericktown.
H. M. Whitener, Sec'y, Fredericktown.

Montgomery County Horticultural Society—
F. Gutman, Pres't, Hugo.
C. Hausser, Sec'y, Hugo.

Missouri-Arkansas Horticultural Society—
C. Barnard, Pres't, Thayer.
P. P. B. Hynson, Sec'y, Mammoth Springs, Ark

Miller County Horticultural Society—
Rev. John Vetter, Sec'y, Eldon.

Pettis County Horticultural Society—
G. B. Lamm, Pres't, Sedalia.
L T. Kirk, Sec'y, LaMonte.

Polk County Horticultural Society—
G. W. Williams, Pres't, Humansville.
J. L. Strader, Sec'y, Humansville.

Phelps County Horticultural Society—
Robert Merriwether, Pres't, Rolla.
W. W. Southgate, Sec'y, Rolla.

St. Francois County Horticultural Society—
W. F. Hoey, Pres't, Farmington.
T. B. Chandler, Sec'y, Farmington.

COUNTY SOCIETIES—Continued.

Tri-county Horticultural Society—
  J. H. Holloway, Pres't, Richland.
  S. Kellar, Sec'y, Richland.

Ripley County Horticultural Society—
  J. G. Hancock, Pres't, Doniphan.
  T. W. Mabrey, Sec'y, Doniphan.

South Missouri Horticultural Society—
  H. D. McKay, Pres't, Olden.
  J. T. Snodgrass, Sec'y, West Plains.

Saline County Horticultural Society—
  J. T. Stewart, Pres't, Blackburn.
  Thos. Adams, Sec'y, Marshall.

Vernon County Horticultural Society—
  A. Ambrose, Pres't, Nevada.
  ——— ———, Sec'y, Nevada.

Missouri Valley Horticultural Society—
  J. C. Evans, Pres't, Harlem, Mo.
  A. Chandler, Sec'y, Argentine, Kas.

SUMMER MEETING.

HELD AT COLUMBIA. MO., JUNE 6, 7, 8.

The Society returned to its old grounds after a lapse of 12 years, and found quite a difference in the delegation present now and at that time.

In spite of the very, very busy time to the fruit-grower, a large number of the fruit men of the State were present, and a very successful meeting was held.

At no place where the Society has held its meetings was a more unbounded hospitality manifested. All the members were taken possession of and taken to the homes of the generous people of Columbia.

Here, at the seat of learning for the State, where are located the University, the Agricultural College and the Experiment Station, was certainly a good place to meet.

The long, cold rains of spring, their frosts, and the weeds incident thereto, were the causes of very many of our members being compelled to remain at home. The berry crop, just ripening, and the busy season it brings, kept away many. Nevertheless, a goodly number of the best men of the State were there to take part in the work, the papers and the discussions.

The place of meeting, Music hall, was beautifully decorated, and large tables were filled with plants and fruits from the Agricultural College grounds.

The Society was called to order by the Vice-President, N. F. Murray. A piano solo was given by Miss Letitia Todd, and after the opening prayer, he introduced Dr. W. Pope Yeaman, who delivered the opening address :

Mr. President and Gentlemen of The Missouri Horticultural Society :

To me is deputed more than the duty—the pleasure of welcoming you in behalf of the Boone County Horticultural Society, to the hospitality of Columbia and Boone county. This is more than the regulation conventionality. It is in spirit a hearty welcome, a cordial greeting. Our people have an open hand and a warm heart for all persons and all organizations looking to the happiness of man, the improvement of social conditions — the general welfare. It is no more than simple justice to credit the State Horticultural Society of Missouri with all these high aims in its comprehensive enterprise and beneficence.

We welcome you because you represent and foster an interest inseparable from the most ancient and honorable of human vocations — agriculture. Horticulture, particularly in our great West, is practically a department of agriculture. It might be well if we were educated to the point of making horticulture a specialty. No doubt the State Horticultural Society and the Agricultural Experiment Station have given and will continue to give this subject due consideration. The present conditions of agriculture and the prospects for the agriculturist seem to suggest the necessity for some modifications, if not revolution, in western farm methods. We have for years been hoping against hope, looking for some turn in affairs that might bring to the farmer a fair recompense for his investment of money and labor. A greater diversity of pursuit may be a necessity. It is no more than a natural inquiry of horticulture: how far can it be brought to the relief of agriculture? Do our soil and climatic conditions and our relation to the great markets encourage the appropriation of large areas of land to fruit-growing?

It seems appropriate to this occasion to recall the attention of horticulturists to the rapidly growing tendency of population to our towns and cities. The increase of urban population and the growing demand for vegetable and fruit diet must introduce the horticulturists to the front ranks of the producers of the world's sustenation.

The day for the compact and efficient organization of the different departments of production has come and now is. I do not know how better the interest of production can be advanced and protected than by mutual instruction and fraternal co-operation.

We welcome you because Columbia people are especially interested in every well-devised means for the development and perfection of the higher phases of human life. I indulge in no unwarrantable spirit of local pride when I claim for this community an unusual public spirit and disinterested magnanimity in educational enterprises and institutions. An intelligent apprehension of horticulture, from a scientific as well as a social and utilitarian point of view, recognizes in it an educational force.

The study of botanical biology in connection with entomology leads the mind up to an intelligent appreciation of its wonderful and beautiful law by which the varied economy of nature is ruled. No one can understand the fructifying forces of soil constituents, climatic conditions and cultivation of fruit-bearing vegetation, without an appreciable development of the faculties of mind and soul. Education means more than the traditional school instruction and conventional scholastic methods. Man needs the cultivation, expansion and refinement of all the vast capabilities, all the marvelous powers, of his complex being. He must be lifted up to an intelligent co-operation with the unity of law that pervades the realm of the natural and the spiritual. He must be able to enter into sympathy with the harmonious blending of the useful and the beautiful.

He who sees nothing but pennies in the blushing pyrus, nothing but nickels in the tempting nectarine, nothing but cents in the sweet-scented plum bloom, and only greenbacks in the generous clusters of grapes, can see no excellency in human virtue and no merit in magnanimity. He who sees no charms in the lotus, no loveliness in the Mareschal Niel, no smiles in the hyancith, cannot be charmed by the graces and perfectness of human life.

You, gentlemen, in your high calling are invaluable coadjutors of the schools and the universities. You contribute to the love of the beautiful and aid in direct association of that divine sentiment with actual conditions of real life.

We welcome you then as co-laborers in the great work of individual improvement and social amelioration.

We welcome you to the seat of your own great State institution, the State University; you are welcome to the State Agricultural and Horticultural farms, to the Agricultural Experiment station, and to our several prosperous colleges not of State patronage. We welcome you to our homes. We welcome you to all that is in sight, and for the unseen you are welcome to wonder and inquiry.

Mr. President, you and your Society are welcome—twice welcome.

President Evans responded. He contrasted the present meeting with one held a number of years ago in Columbia, when only a half-dozen persons were present. He thought that the Society and Columbia had both grown since that time. He spoke of Missouri's horticultural exhibit at the World's Fair, and said it ranked with the best.

Miss Jessie Matthews sang delightfully Dudley Buck's "Storm and Sunshine." Miss Carrie Kerr was accompanist. The thrilling story of "Lasca" was told in a splendid recitation by Miss Estelle Watson.

Dr. George D. Purinton spoke of "Botany as a Study and Teacher." Botany, he thought, was a great study and wonderful teacher. It develops the power of observation. The child should early begin its study. Some children in kindergartens know more about natural science than many college-graduates. Education without botany is one-sided. Botany should be taught in elementary and primary schools. The study develops a knowledge of nature much to be desired. It contributes to the breadth of knowledge. Botany touches all sciences. Its study develops a spirit of inquiry and a vast field of useful knowledge. Botany teaches us the value of the esthetic and the value of the practical. It cultivates reverence for nature and nature's God.

Dr. Purinton's address was a convincing argument for the study of botany and vegetable biology.

CULTIVATION OF FLOWERS.

MRS. H. B. LONSDALE. COLUMBIA.

Scarcely any subject deemed worthy of discussion is more trite than the "Cultivation of Flowers," and to presume to offer you any original thoughts thereupon would be assumption indeed; with a flower department in almost every paper, even in that wonderful and widely circulated "Republic," where the condensed wisdom of all the theorsts and experimentalists is offered free, there is little need of added words on *how* to cultivate flowers; but ofttimes we hear the assertion that it is not worth while to try to have flowers without unlimited means, that they are "so much trouble" and "do not pay," etc. "God might have made the earth bring forth enough for great and small, the oak tree, and the cedar tree, and not a flower at all."

That he did not so organize vegetation proves that a better way was His. and that the dainty blossoms and the magnificent floral beauties have a mission in the world besides that of propagation, and that the wondrous coloring which bedecks the carpet of the earth was with a purpose woven there.

But neither the veriest utilitarian nor the shrewdest philanthropist has any objection to flowers in their native growth, nor stops to wonder why they live; they cost nothing, and time is too precious to waste in any argument or appreciation; and when wealth makes splendid floral displays, and science and art are taxed to produce the most marvelous and entrancing collections, when language is too meager to describe the bewildering glories, scant disapproval comes, even from those who would not so expend their means. This is but a legitimate method of expending large incomes, a commendable decoration an unselfish picture for one's gazing friends, a cultivating and refining influences for the vulgar passer-by.

But, should some one of moderate means wish to adorn her home with flowers, an adverse feeling is forthwith expressed, and sharp criticism wonders that any one with limited funds will fritter away the precious stuff on useless flowers.

Perhaps this censure falls from friendly lips, and the sensitive soul is wounded and reproached, and forbears to obtain the coveted plants, and 'tis counted a victory won by common sense; but is it not too dearly bought?

Have flowers no mission but to gratify the taste of the rich, or please the eye of the chance observer?

Truly these decorations of a Master's hand are wisely adapted to even a higher purpose than simply charming and satisfying the innate love of beauty ever existing, though sometimes latent, in every heart.

Let those whose object is a gorgeous display of color or a limitless wealth of odorous sweetness, open their purses and speak their behest, the results are wondrous and enchanting; but to the genuine flower or plant lover these qualities of color and fragrance are but incidental features in study of development.

Surely every woman should be encouraged to grow a few plants, if but for the "fresh air" treatment it involves, for the busiest woman soon learns that the vitiated air will not suffice for her plants, and though she is indifferent for her own sake, for theirs the life-giving breath of heaven is admitted, even in cold weather, and before Jack Frost is fairly out of sight in spring, the plants are relegated to the open air, and in ministering to them comes added vigor.

But some thoughtful man, who fears lest a button be forgotten, or a favorite dish be neglected, says, "To the weary woman these plants are but an added care, leave them for those who have leisure and help." True, they are a care; so is the little child, but more fondly twine the affections around it for this reason. The care, and growth responding to the care, is solace to a weary soul, bringing a change of thought, an ever increasing interest in improvement and development, a constant outlook for results to come, that help one to forget the burdens that harass and disturb the every-day life of the average woman.

The many and unavoidable failures and accidents that worry and perplex are wisely ignored or forgotten, when the watchful eye is surprised by some thrifty shoots, or some new form of æstivation, or some unexpected coloring in the longed for bloom.

And a gentle ministration in the hour of sorrow comes from the treasured plants, be they many or few, the friends of years or the brilliant annuals responding so promptly to nature's caressing beams and showers. Every leaf is a reminder of Him whose wondrous power has formed and fashioned it, and in its unfolding is betokened the coming forth with vigor of the renewed life, renewed and strengthened by divine power.

Each flower of varied hue speaks of the skillful fashioner who transplants our loved ones to bloom on eternity's shore, and to all comes the lesson of dependence and trust in a higher power; for guard and nourish as one may, no hand-book can insure perfect success, no dissertation account for frequent failures. For it is no less true of the vegetable than the spiritual kingdom, that Paul may plant and Apollos water, only God can give the increase.

Nor need one be a botanist, in order to derive pleasure and profit from the care of plants. While the knowledge of their properties and peculiarities may deepen the interest for many, the tired housewife or the toil-worn seamstress can joyfully inhale the fragrance of the sweet violet, or lovingly admire the gorgeous geranium, without caring whether they be exogens or endogens. But I fancy some utilitarian may say, who has time to waste on flowers when there are so many duties to absorb it all? But the fragments of time will suffice; the moments that would otherwise be spent bewailing a hard lot, or uncongenial tasks, are better employed in ministering to these uncomplaining friends: and the words of gossip or criticism are unspoken while the curiosity expends itself in examination and comparison of floral treasures.

There may be blundering along this line as in any field of divertisement, or of labor; sometimes the spirit of greed is indulged unduly, and a longing for every new variety of plant, if gratified, even without expense, by obtaining slips and exchanging seeds, brings about an "embarrassment of riches" that neutralizes its own benefits; and what was pleasure and profit becomes a burden and a bore, just as with a very large circle of acquaintances we would know but little concerning most of them, nor be greatly attached to any of them. With all the accumulated wisdom that is formulated in directions for the culture of flowers, the beginner need not broadly err, but there is danger of overdoing the work, and permitting the few plants that are to be a solace and a comfort to be the recipients of so many attentions that they languish, dissatisfied, as an over-indulged child. As with the children so it is with our favorite flowers, they are often best aided by a little "judicious letting alone."

God's world is grand and beautiful, and wheresoever we bring ourselves in communion with nature, and subject ourselves to her silent influences, we are strengthened and ennobled; and if we may not wander far amid scenes of grandeur, nor view with rapture the wonderful results of man's efforts in the floral field, nor even tread our own richly decked "banks and braes," we may gather to ourselves a few favorites, and watching the ever-changing growth and reproduction, find strengthened faith in the loving care of Him who even "clothes the lilies of the field."

THE FLOWER GARDEN.

MRS. W. H. BASS, COLUMBIA.

Your worthy President has asked me to read on this occasion something on floriculture, and I reluctantly consented to do so. I have never, in all my life, tried to let my thoughts run down my pencil point on this my favorite subject, or indeed on any other subject, intended for the public ear. Should you ask me when my love for flowers began, I could not tell you, for I really believe it was my most valuable inheritance, certainly the one that has afferded me most real pleasure. I know, too, that it has grown on me until it almost amounts to a passion. Yet when I attempted to write something that would be of practical use to you, I found myself in the dilemma that every school-boy has passed through when attempting his first essay, namely: I wrote down this great truth and starter, "There are a great many kinds of flowers," and then stopped short, experiencing, as the boy did, that the truth was too big for me and I had exhausted myself. But for truth we should always be thankful, and for this one I thank God daily. Literally, he has planted them everywhere, from down in the tropics where the magnolias and jasmines rear their proud heads up into His sunlight, offering a thanksgiving of perfume and of beauty, even to the mountain tops in eternal snow, where the adventurous traveler finds the modest forget-me-nots and *eidel weis* keeping their little blue eyes on God in silent prayer. Everywhere, everywhere, that His creatures go you find them to comfort and cheer.

The cultivation of flowers is one of the most seductive of pleasures, and here I refer to the manual labor connected with their growth. I do not believe that any one can derive the same pleasure who simply knows them to wear them after they have been purchased from the florist, as that one who plants, waters and prunes until flower-time comes; and then with what a satisfaction is worn the rose resting on a cushion of smilax or citronella, all grown by her own hand. Can any corsage bouquet, be it ever so costly, be so fragrant and beautiful as that one composed of flowers, every detail of growth, leaf, branch and bud you intimately know, watching the opening sepals to see if the delicate petals beneath are pink or blue, even as a young mother watches the opening of baby's eyelids to see if eyes of blue or eyes of brown are concealed beneath.

The pleasure of propagating flowers in the various ways, from seeds, from layers, etc., is greater even than the cultivation of plants that some one else has induced to take to themselves separate individual lives. This I consider of high educative value, for I believe a child gets more true growth from simply raising one rose or begonia to bloom from cutting or seed than they would from the study of a dozen pages in geography or arithmetic. You may call this high treason if you like, but you let children rear and tend something into life and you soften and gentle them; you bring them into touch with nature, and through nature you lead them up to God. For I am convinced no human can be wholly bad who has left in his make-up love for a flower.

There is hardly a home so poor that cannot claim its pot of flowers. The spirit of the Master seems to be in them. A quotation, if you please: "The humbler the home, the more pleasure they seem to take in growing. Nowhere have I ever seen such wealth of red and gold as in the hollyhocks, sunflowers and asters that grow on either side of the path that leads to the laborer's door." Or where does the morning-glory so luxuriate as over his lowly thatched porch? Wherever you find their yards filled with flowers, you find them sober, industrious and God-fearing. Could we engage in a nobler mission than in the giving of a few plants and seeds to our poorer neighbors, thereby enabling them to take their few thoughts out of self and of the pinching poverty that surrounds them? Ideally, sowing seeds of kindness for the harvest by and by.

This leads me to speak of the highest pleasure my flowers afford me—that of dividing with others. They are like good deeds, they grow by giving, and nothing makes finer roses than by plucking off those that are full blown and giving to others. They have that rich quality that Shakspeare attributes to mercy. They bless her that gives and her that takes. Above all, they teach me unselfishness and generosity. But I find so many lessons and so much of pleasure that I cannot begin to tell all.

WEDNESDAY, June 7, 9 a. m.

The Society convened in the hall at 9 a. m., and at once proceeded to take up that all-important subject, "Orchards."

The first paper was by D. A. Robnett, of Columbia.

ORCHARD-GROWING IN CENTRAL MISSOURI.

The subject given me is one on which I might have been able to give you very correct figures, had our worthy Secretary notified me five years ago that he would call on me, some time in the future, for a paper on this subject.

Having never kept any account of expenses, I will have to estimate the cost from memory.

The value of land in Central Missouri ranges from $5 to $50 per acre. Nearly all persons interested in horticulture agree that timber or hilly land is best for orchards. It seems that nature has especially endowed this portion of our land for fruit culture. Hence, we do not want the highest priced prairie land, but we must choose for our orchards, lands that are best applied to growing trees, and those that are well drained.

Such lands can be bought for from $5 to $20 per acre, owing to location and improvements. However, I would not make the price of land my first consideration, but would consider shipping facilities and adaptability of land as more important features.

The soil of Central Missouri, with its verdant hills and fertile valleys, seems peculiarly adapted to fruit-growing. There are many advantages in this portion of our State to offer to those wishing to engage in fruit-growing.

There are thousands of acres of the very finest orchard lands on earth in Central Missouri. The lands on the north side of the Missouri river between Bluffton and Glasgow are especially fine for orchards. This land can be bought at from $5 to $20 per acre, and all this land is within five miles, or less, of railroad depot, and the same distance from Missouri river.

The cost of preparing land depends largely upon lands chosen. He who selects land with much undergrowth makes for himself much labor and expense, for no man gets pay for clearing land. I had rather take a river bluff farm, one worn out by cultivation, and put it in orchard, than devote the labor required to clear and keep down sprouts, to hauling much manure and plowing under clover. No man can cultivate trees in newly cleared land without much labor and great expense. Therefore we will not attempt to estimate the cost of orchards on such land.

My first orchard was on clover land, plowed in October with four heavy horses to riding plow, so as to keep it in the ground, plowed as deep as possible. We then took two-horse plow and laid land off both ways 25×25 feet. This land was now ready for trees at cost of $1.25 per acre.

The cost of preparing land for another orchard on thin land was greater. We first sowed land to oats in the spring, then July 1st plowed oats under four inches, and again, October 1st, plowed land eight inches with riding plow, and followed trench-plowing with two horses to shovel plow, not throwing subsoil out, but simply making drainage.

This orchard was laid off with check-row wire with wire-marks on it every twenty-five feet, thus giving me perfect rows and making the work so much easier and nicer than laying land off with plow. This last preparation was much more expensive than the first, but I am sure that the crop of oats and three plowings have been of great value to the orchard. So you see there are expensive ways of setting an orchard. Still, I think all money spent in this way will return a large per cent.

As to the cost of planting, there may be wide difference of opinion arising from two principal points, namely, amount paid for trees and number of trees set to an acre.

Our preference for trees is a two-year-old tree with low head and without fork. Such trees can usually be bought from a good reliable nurseryman in large quantities at low rates, say six cents each, but from tree peddlers you may pay even fabulous prices.

Now our experience has been to set 70 trees per acre at six cents, making a cost of $4.20 per acre; cost of digging holes and setting 70 trees $1; cost of protecting trees from borer and rabbits for five years with wire gauze is about two cents per tree, or $1.40 per acre—this making a total cost of $7.85 per acre for planting orchard on above land.

First three years plant to corn or any hoed crop—planting only between rows one way, leaving four feet on either side of trees, in order to continue cultivation, and keep the ground loose around trees until August 1st, when all cultivation must cease. The crop thus raised will pay for above cultivation, but your trees require constant care to keep them well set, for they will become loose in the ground in wet weather. They must also be hoed two or three times each year, and the wire to protect from borer must be put down in May and raised again in August. Your trees will also need some pruning to shape them well. This last work will cost about $2 per acre each year for three years. After this give your orchard one year of thorough cultivation by breaking in spring, then continue cultivation with cut-away harrow and hoe until August 1st. This will cost about $6 per acre. The fifth spring put land in fine shape and sow to clover between rows, leaving four feet on either side of trees and cultivate with plow and hoe, making a cost of $5 per acre. Next season allow clover to take over the space between rows and hoe only around just under the trees. Keep trees from becoming loose in the ground and continue to shape trees by light pruning. This last year's work will add another cost of $2 per acre. Now all these years you should be hauling all the wood ashes you can get within 10 miles of your orchard.

Spent lime at 25 cents a load has been used with good results.

Now, footing up the costs aimed to be set forth in this paper, you will find:

	Per acre		Per acre
Lands costing about	$28 00	Sowing to clover and care fifth year	5 00
Planting and protecting with wire	7 85	Hoeing and care sixth year	2 00
Care ($2 per year first three years)	6 00	You will find a total cost of	$54 85
Thorough cultivation fourth year	6 00		

Of course this amount does not include hauling ashes, manure, draining or replanting. These expenses may be great or small, as one may choose. With me replanting has been a nominal expense. Out of one planting of a hundred Garber and Kiefer pears I lost not one and a very small per cent of all other trees planted.

A real horticulturist, one who loves his trees, will spare neither time, pains nor money, to make success. If we love our trees we will nurse them and feed them, and patiently wait for the time to reap our abundant reward.

IN NORTH MISSOURI.

N. F. MURRAY, OREGON.

We have in north Missouri three distinct classes of land. First, beginning at the rivers, we have rich bottom land from one to 10 miles wide, back of this we have a range of bluff and hill land from one to five miles wide; and back of this rich, rolling and level prairie.

Orchards are grown successfully on all three of these subdivisions by selecting the most favorable spots, and might be extended over almost all of North Missouri by artificial drainage and thorough preparation. But in order to present this subject intelligently, we find it necessary to speak of these three sections separately.

First, the bottom lands will range in price from $10 to $50 per acre, the low priced bottom lands being wet and subject to overflow. These are unfit for orchards. The higher and better class will cost, on an average, about $40 per acre, and would need no preparation except to plow, harrow and check 30 feet each way. This would be worth $2. Fifty 3-year-old trees would cost $5, the planting $1, total for one acre, $48; and for 40 acres $1950.

The cost of care and cultivation from and after planting depends on how much you give them. But we will count on giving them good care, which will include protection from rabbits and borers. Replanting the few that may fail to grow or get destroyed, pruning and keeping the ground well cultivated and clean of weeds can all be done and well done from the income of corn and vegetables grown in the orchard for the first five years—this land being very rich and never failing to produce heavy crops of corn and potatoes, which may and should be grown in the young orchard. It is safe to say that the income from such crops will cover all cost of good care and cultivation. The rental value of such land would be $4 per acre, which, in five years, would be $20 per acre. Add this to the first cost and we have an orchard beginning to bear at a cost of $68 per acre. But the tax has not been counted, and the interest on money received from rent. So we will add $7 an acre, and say that the orchard at the end of five years has cost the owner for land, preparation, planting, care and culture, all of $75 an acre, or $3000 for 40 acres containing 2000 trees, which, at $3 each, the lowest value put on such trees by competent judges, will make $6000, and you can't buy such orchards for this money, as the owner puts a much higher value on them. The cost of land, preparation, cost of trees, cultivation, value of crops and result on the best rolling prairie land would be about the same.

The bluff and hill range along the river and smaller streams of North Missouri constitute the best and cheapest orchard land in this part of the State, and we believe they are unexcelled by any other country, and only equaled by a few similar and highly favored spots on the globe.

All orchards must have drainage, either natural or artificial, and the more perfect the drainage the better it will be for the health of the trees and the quality of the fruit, and if to land drainage we can add air drainage, so much the better.

And this we can only have on bluffs and hills with deep hollows and ravines for cold air and frost to settle in, the warm air rising during the night, and protecting the fruit on the higher land. Here some have been led into the error of thinking that altitude was all that was needed. Not so, for on the great plateaus of the world we often find immense tracts of land so nearly of the same level as not to afford sufficient drainage for the surplus water, and in all such places we find but little variation of temperature arising from difference in elevation, hence the high appreciation in general of bluff and hill land and land adjacent to rivers and large bodies of water where fruit is grown for orchards, as it often saves them from killing frosts by fog.

The cost of the bluff and hill land in North Missouri ranges from $10 to $30 per acre, owing to lay of land, locality and improvement. That at $10 would be the field unimproved, of which there is only a small amount, and from the most of which the timber has been cut once, but on most of which there is a second growth sufficient in value of cord-wood to pay for clearing the land. The average cost of such land when prepared for planting would be $15 per acre. The average cost of improved farms in this range is $25 per acre, all ready for planting except plowing. Not one acre of this will ever need artificial drainage, for the reason that it not only has the surface drainage, but most of them are underlaid with beds of marl, varying from 50 to 100 feet deep, and of equal fertility from the surface to the bottom of the formation. These marl beds are perforated with orifices from the surface to the bottom, connecting with each other, and, in the language of Prof. Swallow, constitute the most thorough system of drainage imaginable. This formation is exceedingly light and mellow, and is full of all the elements required to sustain vegetable life. It is very friable, and there is probably no soil in existence that under the plow becomes more loose and mellow, yet, from its superior natural under-drainage, it can be worked after a week's rain with but a few hours of sunshine. This formation is of inexhaustible fertility, and would make a good fertilizer for orchard land in Eastern states that cost from $50 to $200 per acre, and from $20 to $50 more for tile drainage. We have been thus minute in our description of this formation, in order to show the great saving in cost of preparation and fertilizing, and also in cost of cultivation.

All these lands can be cultivated with one-half the team power of Eastern lands. By way of proof and comparison, we have run a turning plow in this land ten inches deep, with a small team of mules, plowing two acres a day; and we have seen on the fine wheat and orchard lands of the Shenandoah valley, Virginia, four large stout horses running a turning plow six inches deep, and a gang of hands following with mauls breaking the clods. In most all of the Eastern states the land is heavy clay, liable to bake hard, in some spots quite stony, in others wet and spouty.

Having been born and raised in northwestern Virginia, and being engaged in the nursery and orchard work from boyhood till I was 30 years of age—in which time I traveled over a number of the Eastern states selling nursery stock—I had a grand opportunity to know what it cost to prepare the land and grow an orchard in that soil. And now, after 24 years spent in the nursery and orchard growing in North Missouri, I am prepared to say that I can prepare the land. plant and cultivate 40 acres of orchard here with the labor and expense that 10 acres would require there. On these bluff lands apple trees should be planted 25 feet apart each way, and on bottom and rich prairie lands 30 feet each way. This will make 50 trees to the acre on bottom and prairie lands and 70 on the bluffs. On the bluffs the trees will not grow so large, will bear earlier and heavier and will color their fruit better than in the other sections. The cost of cultivation and value of crops would not vary a great deal if the right crops are grown and properly managed. The bluffs are fine for small fruits and vegetables and unexcelled for red clover.

We have netted $150 per acre from a crop of celery grown in a young orchard. On this formation a friend netted $80 per acre from potatoes grown in his young orchard, while others, after cutting a crop of clover hay, cut the second crop for seed from some of these lands, which sold and gave a return of $20 per acre. The bluffs and river hills of North Missouri are high, healthy and beautiful, and stand drouth remarkably well, and the main lines of railroad follow the rivers, running along near the foot of the bluffs, which afford good shipping facilities, thereby adding value to small fruit and vegetables grown in the orchard and very much reducing the cost of care and cultivation.

We feel perfectly safe, from our own experience, that if these lands are planted in apple orchards and cultivated in small fruits, vegetables and red clover, they will pay for all the care and cultivation of the same, and return a good interest on the investment after the first year, leaving all the increase in value of orchard from growth of trees a net gain to the owner, which, at the end of five years, counting the trees to be worth $3 each, the lowest value ever put on such orchard by competent judges in North Missouri, and we have $210 per acre. Now we will deduct for cost of land $25 per acre, for trees $7, plowing and checking $2, planting $2, protecting from rabbits $2, for incidental expenses $2; total per acre $40, and for forty acres $1600, on which we have 2800 fine trees in bearing, which, at the low value of $3 each, makes $8400, a net profit over cost of $6800.

But count the cost of land, planting, care and cultivation of the orchard in North Missouri 25 per cent more than is estimated in this paper, and deduct the same from the real value of the orchard at the end of five years, and it will be found that no other investment will return such large profits on capital invested. Carry the orchard forward ten years till it is fifteen years old, and the result will show a much greater gain for the second and third periods of five years than the first. We know many orchards in North Missouri that have netted $100 to $400 per acre in a single year. This beats grain and stock growing, it beats merchandising, it beats banking, it beats gold and silver mining, either with or without free coinage; it beats gambling in stocks on the board of trade, and for young men it will beat sowing wild oats, and yield a more satisfactory harvest. Why, then, do not more engage in orchard growing? Simply because Young America is too impatient to wait a few years for the trees to grow into bearing. The spirit of the age is for investments that will give a quick return. But the quick return, in my mind, has been overworked.

If it were possible to show up North Missouri in all her grandeur and glory, the great advantages of her geographical position in the center of the great union of states, and her grand system of magnificent railroads running out into all parts of the civilized world, giving us a market for all our immense products at our homes; her beautiful rivers and small lakes teeming with fish, numerous mineral springs of health-restoring and life-giving properties, her broad, rich and inexhaustible bottoms, the beautiful and picturesque bluffs of peculiar and unexcelled fertility, her high, rolling, beautiful, productive prairies, the care and pleasure of cultivating these fine, soft, mellow lands, free from stone and clods, and which need no under-drainage, her immense crops of grain and vast herds of fat stock, her wonderful fruits, unexcelled in color and quality; and, above all this, look at her intelligent, industrious, law-abiding citizens, her schools, colleges and churches, thrifty towns and great cities, the wonder and admiration of the world for their rapid growth, energy and wealth—cities that have sprung into existence as by magic, where the whir and buzz of industry never cease, and where commerce ever rolls her golden tide along to enrich the hardy sons of toil.

Let all this be known and spread abroad in the world for North Missouri, and then add all that may be truthfully said of South Missouri, with her untold millions of undeveloped mineral wealth and her millions of acres of fertile land, the virgin soil of which has never been turned by the plow of the husbandman to kiss the sun of heaven. Then speak in words of praise of the grand central portion of this great State, an empire within itself. And last but not least, speak in words of loudest praise of our State University now being rebuilt and enlarged in the beautiful city of Columbia, where not hundreds but thousands seeking an education may be accommodated, and where the sons of the poor and humble of our great State will be made welcome, and in conclusion may I not ask that the people of Columbia and the State University unite their efforts with the State Horticultural Society, to make these great and grand truths concerning our great State more fully and forcibly known to the world through the great Columbian Exposition now being held at Chicago.

Let us not forget that this is our golden opportunity, and if we embrace it and do our duty to our State and our fellow-men, with an eye single to God's honor and glory, then we may rest assured of a golden and bounteous harvest that will be gathered in time and eternity.

HONEY AND HORTICULTURE.

W. H. SEWELL, CARTHAGE.

Bees and honey are mentioned frequently by the oldest writers, both in sacred and profane history, hence it is probable that considerable has been known of bees and their habits, as also the value of honey as human food, from very ancient times. But it is quite probable that of the art of bee-keeping in artificial hives, even of the rudest form, nothing was known until comparatively modern times. Our domestic hive bee is supposed to be a native of southern Europe, and must have been diffused over northern Europe and Great Britain at a very early date. It found its way to America among the early settlers, but the exact date of its advent is not known. In its increase it kept pace with the settlements, until it has now spread over the whole continent and become wild, and many people at the present day do not know but they are natives of the country. For a long time after bees were managed in large apiaries all over Europe, Britain and even in America, the greatest ignorance and superstition prevailed among the masses as to rational methods of management. They were housed in log gums and straw hives of one apartment only, and the method of obtaining the stores was by robbing by moonlight, or the brimstone pit. The honey was dark and badly mixed with bee-bread, if not with bees of all ages, and had to be strained in order to be endurable. Until the commencement of the present century almost nothing was practically known of the nature, habits, design and offices of the different members of the colony or the ends they severally subserve in the economy of the hive, or the mysterious methods of their reproduction. But with the adoption of the movable comb hive by Langstroth and others about 40 or at most 50 years ago, and many other improved methods of management that followed close in its wake, chief among which were artificial swarming and the rotary honey extractor, bee-keeping received a new impetus, and has now grown to gigantic proportions in many parts of the country, and is fully abreast with the improvements of the times in all respects and is likely to hold its position in the future.

But it is not my object to write a history of apiarian science. As the bee is so closely connected with horticulture by its usefulness in pollenizing the flowers, and as the fruit-grower, by virtue of his occupation, is a great producer of honey in his fruit-flowers (for honey is a vegetable production and not manufactured by the bees as some have supposed), hence it seems but natural that he should wish to utilize this wasting ambrosial nectar, by keeping at least a few stands of bees, and deriving both pleasure and profit from the investment, besides adding another of nature's luxuries to his table. There is nothing more attractive to the eye or tempting to the appetite than a virgin comb of beautiful, fragrant white-clover honey for a party lunch or a picnic dinner, especially when we think of it in connection with a slice of flaky bread, spread with golden Jersey butter, and enjoyed with a glass of cold rich milk. Hence it is plain that the poet had an eye to business when he wrote:

"Oh for the life of a farmer's wife,
With bread so light
And honey white,
And milk so pure and good."

Bees occupy but little room in proportion to their importance, and require no great deal of attention except in the swarming season, nor much outlay of capital, and are not taxable in most of the states.

No one should attempt to keep even a few stands of bees in this day of advancing science without first reading some one or more of our good, thorough books on bee-keeping (of which there are many), such as L. L Langstroth, or something more recent if there are no late editions of his book something that treats the subject thoroughly, not some pamphlet telling how to manage somebody's patent "moth-proof" hive, with which the country is unfortunately flooded. More thorough, practical information can be learned from good books and papers in a few weeks of attentive reading and by experience or conferring with one's neighbors in many years, vastly cheaper and more systematically. Such books and papers will give the information necessary to settle a thousand and one questions daily presenting themselves for solution in the routine of thorough intelligent management and if the precepts are faithfully adhered to, the bee-keeper will speedily become independent of his books and master of his business.

A few stands of bees can be kept with comparative advantage by any fruit-grower in almost any locality, as the necessary care may be given in the odd moments of leisure without being missed; besides, the pleasure of studying such a branch of natural history is considerable, even if it did not pay financially. Many successful fruit-growers in favorable localities for bee pasturage have become experts as aparians on a considerable scale, giving good care to both branches, and reaping a double reward from their orchards and fields.

But if one expects to engage in bee-keeping on a very large scale for commercial purposes, he should not connect it with horticulture, but give it his entire attention, and should be favorably located as to bee pasturage, market, and last but not least, should be in a good climate, for climate has much to do with both the quantity and quality of honey. The colder the climate the thicker the honey and the better the flavor, but the more temperate climates produce the largest quantities of honey of medium quality. Extreme wet or extreme dry weather is unfavorable, as in the former case much of the nectar is washed out of the flowers, and in the latter vegetation is shriveled up and flowering ceases, and in very hot weather there is but little honey produced in the flowers, even with fair growth of vegetation.

In a country like California or Arizona, where the weather is usually dry but not excessively hot, and the bee pasturage (mostly alfalfa) not only very abundant, but kept constantly in vigorous condition by irrigation, as there is but little rain to wash the nectar out of the flowers, the flow of honey is extremely regular all the season, from early spring to late fall, and the aggregate yield is remarkably large. These countries for honey production have justly earned the enviable reputation of being as good as any, if not the greatest in the world. While this honey is all right in appearance, being about as white as any, it is not so rich in flavor nor so thick as that of some other localities. The richest honey with which I am familiar is made from the flowers of a weed called Spanish-needle, and is of a deep golden color, and so thick that it can scarcely be made to flow, and so rich that but few people can eat more than a very small amount without clogging the stomach. All the clovers are rich in honey of excellent quality and mild flavor. The flowers of the basswood tree are also rich in honey, as also those of buckwheat, but while the yield of the latter is large the quality is about the poorest known. About all the fruit flowers are hich in honey of a good quality, but they are not numerous enough to cut much of a figure as compared with the clovers for large apiaries, as the latter are so much more abundant, except perhaps in some rare localities.

The yield of honey in any country is very much affected by the method of management—whether the honey is sold in the combs just as it was stored in the surplus honey-boxes (known as comb honey), or whether the honey is removed from the combs as fast as the cells are sealed over by the bees, as then it is in condition to keep. This is done by rotating the combs (after the caps are removed from the cells) in a machine called an extractor. It is then stored in self-sealing glass jars, and sold as "extracted honey" The former brings a much better price, as the quality is better and the honey thicker and more apt to keep. The latter is more liable to sour, as many bee-keepers, in their zeal to get the honey, extract it before all the cells are sealed, leaving it more watery. Sometimes such honey is adulterated. For these reasons, and perhaps others, the extracted article is not so popular and brings less. Yet, there is still quite a margin in favor of extracting, as the quantity stored by a given number of hives is so much greater than that of comb honey. This is because the wax of which the combs are made is evolved from honey in a very peculiar way in scales on the outside of the abdomen of the bee, somewhat analogous to the formation of tallow on the inside of the ox; and it has been ascertained by experiment that it takes about twenty pounds of honey to make one pound of new empty combs (one pound of wax). This would be quite a large bulk of combs, as they are very light.

When developing wax, the bees are gorged to surfeiting and remain quiet in the warmest part of the hive; so it not only requires a large consumption of honey, but requires a large force of workers to keep up the required heat and produce the wax and build the combs, that could otherwise be employed in collecting honey. Hence, it is very plain that when empty combs are furnished to the bees as fast as they can fill them, they not only save the honey that it takes to build them, but they are able to furnish a much larger force in the honey-fields.

Napoleon said, "The secret of success in war is in having heavy battalions in the right place at the right time." If this is true in warfare, it is equally so in the honey harvest. Bees can never be induced to build combs any faster than they can gather honey to fill them. So when honey is very abundant, much precious time is lost if there are no combs ready until they can be built, and as these seasons are frequently short, the best opportunity is generally gone before much is accomplished. Where a stock of empty combs is kept on hand by the apiarian and furnished in abundance as fast as they can be filled, the amount of honey that can be stored in a given time by a strong colony is astonishing. One strong colony will store more honey than many weak ones.

The great trouble about extracting honey is that it takes considerable time and skill, and is difficult to manage successfully except on a large scale. The same may be said of the multiplication of bees by division or artificial swarming. Hence, the small bee-keeper, and especially the amateur, had better depend on natural swarming for his increase in stock and on the system of comb-honey, for his profits, stored in top boxes either with or without movable frames, as by so doing he will be far less likely to make serious mistakes, and the returns will be surer and more satisfactory, if the quantity is not so great as it might be made in the hands of an expert. Yet it will not be amiss for the small bee-keeper to try his hand cautiously at dividing his bees after he has read up pretty well and begins to feel somewhat at home with his bees, as he will thus verify many things that he has read, and fix them in his mind in such a way as they will never be forgotten. This is especially important if he is young, and has aspirations to work on a larger scale, for this will test his ability, energy and pluck, for it takes pluck to manage bees successfully on a large scale by the latest improved methods. He must also be a close observer, quick to perceive, prompt to act, thorough in his methods, but with enough deliberation to secure prudence. Indeed all these qualities are essential in handling bees, whether they are many or few. Bee-keeping and horticulture are so intimately connected and so similar in their requisites, that any one who is capable of making a thorough success of one would be likely to succeed with the other.

A PLEA FOR OUR NATIVE PLANTS.

PROF. G. C. BROADHEAD, COLUMBIA.

With the expansion of the area of civilization, so does the area of cultivated land increase; and in corresponding ratio do we gradually lose sight of many common indigenous plants. Their place may, in part, be supplied by other cultivated plants, but in the groves, in the pastures, they are being replaced by grass or by noxious weeds.

As the buffalo, the deer, the pigeon, the prairie chicken, have nearly disappeared on account of their reckless slaughter by the ruthless hunter, we find their place occupied by the ox, the sheep and the barn-yard fowl; so our wild flowers have been supplanted by the dog-fennel, the burdock, the iron-weed, and so also has the English sparrow driven off our native birds.

In other, but a different and more humane way, by man's industry have our native plants been destroyed, and in their stead are seen fields of waving grain, corn-fields, grassy pastures, the orchard and the vineyard. Upon the destruction of one type arise the flora and the fruit of another type.

Some of our native plants have entirely disappeared. Many of the most beautiful are now rarely to be seen, and then only within the railroad limit of 100 feet. In the hilly woodland region the flora has not materially changed, although many plants which formerly cheered us can now no longer be seen.

But the prairies are shorn of their beauty, never more to appear. Thirty and forty years ago—aye, twenty years ago—our prairies were the chief charm of the western country. On the upland the *Andropogon* waved its plumes at 4 to 6 feet high, and on lower ground the *Spartina* reared its head 8 feet high. The purple *Liatris*, the red *Echinacea*, the *Coreopsis*, the *Silphium* and many others with their varied colors bedecked the grassy plains. The beautiful *Gentiana puberesla* could occasionally be found as the latest autumn bloomer upon the prairies. Now it is no longer to be found. In swamps, the rich-colored Cardinal Lobelia could be occasionally found; in such places it may yet exist, but I have not seen it during recent years.

The *Netumbeun luteum* once so common is now rare, chiefly owing to the ravages of the hog. Our Cowslip (*Dodecatheon*), some species of Phlox, the *Mebrunthiuns*, the *Physostigia* and many other plants I have not seen for many years. Farther south in Missouri and Kentucky early travelers speak of extensive cane-breaks, now only found toward the Gulf.

What have we in their stead? About 1870, the *Solanum rostratium* invaded Missouri from its home in Kansas and gained a hold. It now abounds as far east as St. Louis.

Wo also have from the Sunflower State its characteristic tall sunflower introduced into Missouri about 25 years ago from the West. It came to us just before the advent of the Solanum above named. In 1869 I first saw it in the southwestern part of Cass. It now abounds at many places in Missouri. I might especially state that it seems at home on the Wakenda praries, Carroll county. So do changes take place. Our plants disappear, others are introduced. Some trees have even become so acclimated that many persons do not know that they are not indigenous. The Catalpa, the Ailanthus, the Locust, and even certain pines, have been incorporated in a published list of the trees of Kansas, as if they were indigenous, when they are not.

The Catalpa is a native of Southeast Missouri and southwardly the Black Locust, of Kentucky. Their seeds were brought here by early settlers, and the trees are now found nearly everywhere. So of many garden plants.

We should plant and cultivate our handsome wild flowers and they will return to us in blossoms to please.

I now have about eight species of our wild ferns growing in my yard; probably only as many more are found wild in our State. But suppose we read the record of past ages, we find enclosed in the coal shales of one county of Missouri over 40 species of ferns, many of them very beautiful.

In this way is preserved the record of past ages. Man did not destroy them. They grew and flourished under peculiarly favorable conditions. They grew to a luxuriance now nowhere to be found, except within the tropics. By their evidence wonderfully preserved, we know that our climate was once different. Our fossil plants relate to us a remarkable and an interesting as well as valuable history as it is recorded in the strata as leaves within a book, each stratum a record within itself of the wonderful carboniferous age.

They are preserved not only in their beauty of form and structure, but as instructive records of past ages, and as an index of the riches of the age. But to draw a parallel: Will our present living plants as they die be so preserved? We believe not. The conditions of their life are not such as to perpetuate their form. They have grown; they have bloomed; they have died and crumbled to dust, and still continue to do so. Many we may not again see.

But we should not allow this destruction to continue. You, who know of and where to find them, collect the seed, plant and grow them in your gardens or upon your lawns. Preserve our native plants. Do this and you will have performed a deed that future generations will thank you for.

The following committees were appointed:

To visit the Horticultural grounds—
S. Miller, A. Chandler, J. H. Monsees.
On Fruits and Flowers—
W. E. Lilly, G. L. Tippin, A. Halley.
On Obituary—
L. Chubbuck, Samuel Miller, J. E. Marion.
On Finance—
N. F. Murray, A. Chandler, G. B. Lamm.
On Final Resolutions—
A. J. Blake, A. Nelson.

Wednesday, June 7, 2 p. m.

The report on Seedling Strawberries was given by Prof. C. A. Keffer on about 4000 seedlings. From the report made it is safe to say that no results are obtainable, any more so than if each was a chance seedling.

The matter was discussed quite extensively by the Secretary and Prof. Keffer as to how these should be carried out. No results could be deduced from these seedlings, and now, what was wanted was to *breed* seedlings and not *select* them. The Society seemed much disappointed over the way the experiment had been begun, and the results.

The report of the committee to examine the plantation reported as follows:

In examining these we agree so closely with Prof. Keffer's report on the record kept, that we prefer him to make his detailed report as to size, quality, hardiness, productiveness, firmness.

The following were selected as the best, and the berries brought in to show for themselves.

S. Miller,
J. H. Monsees,
A. Chandler.

The afternoon was spent in visiting the grounds of the Experiment Station, examining the large lot of seedling strawberries, the grapes, the raspberries and blackberries and the orchard as well as the grounds themselves.

A grand lunch was given under the shade of the trees to every one present. The good people of Columbia took a special pride in this part of the program, and very many of her best citizens were there to do honor to the Society.

A report of what was found on the Hort. grounds would not be out of place, and is expected from Prof. Keffer.

Enough to say that, aside from the large collection of strawberries, the grounds of every fruit-grower in the Society would be a better lesson than the horticultural grounds.

If the Board of Curators will not give the Hort. department something to work with, we cannot expect anything. Whenever we can see $6000 or $8000 set aside out of the $33,000 for the horticultural department, then we will see something done.

As it is, nothing is being accomplished in the line of experiment or instruction to our fruit-growers.

A drive was taken about the city of Columbia, and out to the large orchard of D. A. Robnett, where over 120 acres were planted to the standard varieties of commercial apples.

One of the most pleasing sights of the day was this beautiful young orchard, four and five years old.

One of these days friend Robnett will have all he wants to attend to in gathering his fruit.

Jonathan, Winesap, Willow Twig, Ben Davis, Gano, are the varieties mostly planted.

SEEDLING STRAWBERRIES.

Three years ago an experiment in the production of new varieties of the strawberry was begun at the Missouri Experiment Station, by my predecessor, Professor J. W. Clark. The seeds of selected fruits of Crescent, Warfield No 2, Lady Rusk, Bubach No. 5 and Gandy were planted, and when I took charge of the Horticultural department in January, 1892, a large number of the seedlings were being grown in seed-boxes and in pots in the green-house, while a plantation of about an acre had already been set with them. The experiment had proceeded so far that it would have been inadvisable to have modified it, hence an effort was made to carry it to completion as originally outlined. The potted plants were set in the garden, and the plantation already growing gave its first crop of fruit the summer of '92 Specimens of some of these seedlings were exhibited at the meeting of this Society at Chillicothe, in June of that year. A wide range, in size, season, color, quantity and quality was observable in the fruits of seedlings of the same variety, and this great diversity invited the closest study. All our improvements in cultivated fruits are largely the results of selection, and this experiment has been an excellent illustration of the tendency of seedlings to vary from the parent type, and the importance of selection as an element in plant improvement.

The best of all kinds were marked, each of the plants was permitted to make a few runners, and the plantation was given good culture for a second year's crop. Last season the date of blooming, the character of the bloom and the fruiting season of all the plants were noted, and those which seemed equal to or better than their parents were carefully marked.

Your Society met at Columbia during the season, and your Chairman kindly appointed a committee to examine the seedlings. The committee carefully examined the plantation and gave me the benefit of their judment in testing, especially such plants as I had previously selected as best. It is a pleasure to report to you that the committee in the main corroborated the judgments already recorded, my placing in the matter of quality being somewhat lower, as a rule, than theirs.

After the fruiting season had passed, runners were allowed to grow, and twelve plants from each selected specimen were potted. When these were well sorted, they were set in a new plantation. Owing to the extraordinary drouth of the past summer, this new plantation has not made as good growth, and it cannot be expected to give even a fair crop the coming year. It may therefore be necessary to prolong the experiment another season before definite results can be announced.

Of course, each seedling must be considered a possible new variety. From the number grown in Professor Clark's plantation, the following selections were made:

Of 814 Warfield No. 2 seedlings, 48 have been saved, and 12 plants of each of these are now ready for fruiting the coming season.

Of 882 Lady Rusk seedlings, 72 were saved as above.

Of 2044 Crescent seedlings, 104 were saved.

Of 394 Bubach No. 5 seedlings, 20 were saved.

Of 166 Gandy seedlings, one was saved.

These selections were made as the result of two years' study, and it is known that in some cases they are not better than their parents, but all are considered better in some important particular than what might be called an average berry.

Twelve plants of each of these 245 selected seedlings should fruit the coming season. The increased number of plants of each kind, with the greatly lessened number of kinds, will make possible more careful study, and will doubtless result in discarding a great many of the seedlings under test. C. A. KEFFER.

Columbia, Mo., January 26, 1894.

WEDNESDAY, June 7, 8 p. m.

The evening program was opened with a fine number in music by Miss E. Hack. It was beautifully rendered and elicited much applause.

Then followed an address by Dr. Paul Schweitzer, on "Soil Absorbtion," which will be found among "Miscellaneous Papers."

At the close of his address a number of questions were asked as to the value of ashes and the quantity per acre. Answer, 35 cents per 100 pounds, $7 per ton, and 500 pounds to 1000 pounds per acre.

After a beautiful song by Miss Tuttle, the following paper was read:

A PLEA FOR A HAND-BOOK OF HORTICULTURAL KNOWLEDGE.

LADIES AND GENTLEMEN—I come before this meeting presenting a paper on a subject which I feel is not only of special interest to the members of this Society, but also to every farmer and every thoughtful citizen of our State. It is of intesest because it invites thought along our line of investigation. While we are trying to clear the rubbish out of our own pathway in fruit-growing, nothing would be more considerate in us than to leave the path over which we have trod and over which untold thousands of others must come, as smooth as we possibly can. Our boys and girls and the untaught and inexperienced who shall come after us must know what we know before they are prepared to advance farther in the horticultural art than we have advanced. Now the question I wish to ask this Society is this: "Do you think that we have done what we could to help the one wishing to come our way to find the path that leads to success?" It seems to me that there is nothing trustworthy, or at hand, or definite and applicable to fruit-growing in Missouri which a youthful or an uninformed mind can get possession of and which embodies in an inviting manner the experience of the practical fruit-growers of our State.

The idea of getting up a "Hand-book of Horticultural Knowledge," or in other words a "Guide to the Study of Fruit-growing in Missouri," is of more than passing interest, because of the great tide of public attention that is now being turned to the production of fruit in this State. As our towns grow larger the home market demands more fruit. There seems to be plenty of reliable information to be drawn from, but it needs classification, illustration, arrangement and simplification. There are scores of practical fruit-growers who will gladly contribute of their experience, but it must be collected and embodied. Many there are who will contribute of their scientific knowledge on just such points as our youth will be delighted in, but no one solicits. These facts and this knowledge put in shape that the undisciplined mind can grasp, are what we wish to accomplish when we suggest that a hand-book of horticultural knowledge be gotten up for the boys and girls of Missouri.

I may be wrong, but I feel that a systematic presentation of this subject is demanded by the one great question that is now stirring from center to circumference the great mass of toiling people, viz.:

"What occupation can we follow that will make us an independent and honorable living?"

If we ask for better wages from large corporations, we are turned out upon the streets by the hundreds without anything to do or any place to go.

Great banks and corporations are failing all over the United States, and thousands of innocent people find themselves with nothing but their hands and brains to help them. A very sober thought takes possession of people bereft of home and money. They begin to think and study the situation. The whole body of producers are beginning to believe that they must pursue their subject exactly as other students pursue theirs.

But I claim that the horticulturist has no text-book—no guide to his study, as other students have guides to their studies. His occupation is no exception. He can experiment, but that is too expensive.

How foolish a druggist would be without careful study and previous training, to choose a location, select a stock of goods and try to write prescriptions and carry on a business.

So a horticulturist will find a knowledge of his subject just as important and necessary. I have made and seen other men make these sad mistakes, and I know whereof I speak.

What we want is some timely, careful training along our line of business and we will avoid expensive blunders. Newspaper clippings won't do. They contain many facts that are not helpful on the practical side of this subject; these I would not care to have embodied in the proposed hand-book.

The theories and the fanciful, they need not be considered. We want to study helpful facts proven by experience to be helpful.

We believe that this Society will rally to the dethronement of wrong statements and allow yourselves to stand between the people and 10,000 expensive blunders that rising generations will make in the future, without a knowledge to guide them and help to save.

We cannot afford to leave this work to the nurserymen, who have trees and vines and flowers to sell; we cannot leave it to the real estate men, who have lands on the market; but, if we are true men and women, we will take a hand in presenting the facts just as they are and just as others will find them when they try to raise fruit in the future on Missouri soil.

Let us put our knowledge in such a shape that a bright mind will catch up with it quickly and go on to greater achievements. If this is within our power to give, then to withhold is to commit an error; to neglect it is to shirk responsibility; to treat it lightly is to retard progress; to go ahead is to win a victory for ourselves, lighten the burden for rising generations and crown our children with success.

As far as we have gone, our outline to a "Guide to the Study of Fruit-growing in Missouri" is as follows:

1. Kinds or classes of fruits grown in Missouri.
2. Definition of terms used in fruit-growing.
3. Classes of insects that influence for good or evil the growth of fruit-trees and fruits.
4. Diseases of fruits and trees.
5. Kinds of birds injurious or beneficial to the horticulturist.
6. Remedies for pests and diseases.
7. The uses of fruits as food.
8. Foreign and tropical fruits used in Missouri.
9. How to best utilize all fruits so they will be marketable.
10. Hardy flowers and shrubs for country homes.
11. What works on horticulture should be read?
12. How best to handle, pack and market fruits.

Our spare time for past six months has been occupied in collecting and compiling helpful information on the subjects just read in your hearing. We have gathered them from the most reliable sources, and asked assistance from every party we thought would be interested and with whom we were acquainted.

Our task is only begun, but the matter is assuming a satisfactory form. Over 50 different parties have contributed to the proposed Guide, or stated when they would have their assigned part ready.

We have taken pains to ask all contributions to be put in the form of questions and answers. We do this because this method is so well adapted for use in schools, clubs and classes, as well as in the home circle. Under this form much or little of the book can be read as opportunity for study is afforded. The questions and answers will follow the subject to which they are related.

The Pettis County Horticultural Society has been very liberal with its funds and influence, and we hope the State Society and every county society will be impressed with the importance of this matter. You might give us a committee on horticultural education to help us, and let the chairman of that committee act as a corresponding secretary until one could be elected. Our Corresponding Secretary, Van B. Wisker, of Sedalia, Mo., is doing good work for us, and has received much valuable information from abroad. E. G. Goff, of Wisconsin; L. R. Taft, Michigan, our own Judge Samuel Miller, Miss Mary E. Murtfeldt, C. C. Bell, Prof. Wm. Trelease, Secretary L. A. Goodman, Prof. W. J. Green, of Ohio Experiment station, and A. B. Smith, of Lawrence, Kansas, have written us very encouraging letters, as well as answered questions assigned them.

All those assisting us can have credit for what they do, and have honorable mention of their work. We ask that a book of this character be published at the lowest possible cost and given out at a very small margin of profit.

Geo. B. Lamm, Sedalia.

The following committee was appointed on Horticultural Education: G. B. Lamm, L. A. Goodman, Mrs. G. E. Dugan, Prof. Geo. D.

Purinton, Van B. Wisker, and were expected to follow out the line of thought now taken up by the society in preparing a hand-book on Horticultural Knowledge.

REPORT OF COMMITTEE ON OBITUARY.

Whereas, Providence has taken from our ranks, since the last meeting of this Society, one of its members, Mr. Fred. Lionberger, your Committee on Obituary beg leave to bear testimony to this body of the loss the Missouri State Horticultural Society and the horticultural interests of the State have sustained.

Mr. Lionberger was a man of merit, unassuming disposition, but an enthusiastic horticulturist, always ready to do his full share of the labor, to him one of love, necessary to the development of this industry. His honesty of character, sterling worth, extended information and rare intelligence endeared him to the members of his society. We miss his presence for many meetings to come; therefore be it

Resolved, That a page of the next annual report of the State Horticultural Society be devoted to memory of our departed friend, and that a copy of this preamble and resolution be transmitted to his family.

Samuel Miller,
J. H. Marion,
Levi Chubbuck.

Adopted by rising vote.

REPORT OF COMMITTEE ON FRUITS.

We, your committee, in passing on the exhibit of fruits and flowers, beg leave to make the following report:

We find a beautiful collection of roses contributed by Prof. Keffer, from the horticultural grounds; also, a fine collection of plants—beautifully arranged—on the tables and about the rostrum, which are contributed by the ladies of Columbia, designed to beautify the hall and make pleasant our reception among them, and we assure them that in no way have they failed in their object. We also find a fine collection of apples of one, two and three years old, exhibited by Mr. Hartzell, of St. Joseph, Missouri, which have been kept by his plan of preserving fruit, and are in excellent condition, and we recommend that the Society award Mr. Hartzell a premium of $5 for best collection of apples; also, a collection of some 50 different sorts of seedling strawberries from the Experimental grounds, a full report of which will be presented by a special committee.

Mr. F. Schmidt, of Sedalia, exhibits a choice box Bubach No 5, and we recommend a premium of 50 cents for same.

Mr. G. P. Pepper exhibits a nice box of strawberries unnamed.

Box of Monarch strawberries by Mr. W. H. Garth, Columbia. We recommend a premium of 50 cents.

Collection of strawberries exhibited by Henry Schnell of Glasgow, among which are some very fine specimens, including Shuster's Gem, Bubach No. 5, Eureka, Windsor Chief, which deserve special notice: the committee recommend that a premium of three dollars be awarded to Mr. Schnell for his collection of the following varieties:

Downing, Crescent, Windsor Chief, Huntsman, Michel's Earle, Eureka, Crawford, Saunders', Farnsworth, Jessie, Lovett's Early, Gen. Putnam, Leader, Shuster's Gem, Parker Early, Cumberland, Hoard, Sharpless, Haverland, Lady

Rusk, Bubach No. 5, Warfield No. 2, Bubach, Great Pacific, Tippecanoe, Boston Eclipse, Beder Wood, Capt. Jack.

The committee recommend a premium of one dollar be awarded Mr. A. P. Berkehile for collection of strawberries.

The committee recommend a premium of fifty cents be awarded Mr. S. W. Gilbert of Thayer, Mo., for one box of Hopkins' raspberries.

Mr. Gilbert also sends a collection of twigs of apple and peach thickly set with fruit, and at this state of the fruit the condition seems to be good—the twig of Family Favorite being very thickly set with fruit.

Geo. L. Tippin,
W. E. Lilly,
L. W. Hayden.

Thursday, June 8, 9 a. m.

Society was called to order and the business matters of the Society were taken up.

The report of the Secretary of the State Horticultural Society was read, as follows:

When, 12 years ago, at the meeting of this Society, held in the Agricultural building, I was chosen President, little did I think that I should be so closely connected with the horticultural interests of the State, or that I would see such a widespread influence and such good results from the feeling there awakened and the work accomplished. Since then our work has been growing and spreading until we find thousands interested in it as a means of livelihood, and thousands of others just as much interested in it as a source of pleasure and education, as well as of love for the beautiful.

The wonderful growth of horticulture in this western country may be traced by hundreds and thousands from their own experience and knowledge. It is not beyond the recollection of the youngest fruit-grower here when a few boxes of berries, a few bushels of peaches, a few hundreds of fruit trees, a few plants from the green-houses, would supply all our demands. Today there lives in this western country the man who was express messenger on the train which carried the first shipment of five crates of strawberries to the Chicago market. Not very many years ago I took to the Kansas City market a few crates of berries, and the market and grocerymen did not know what they should do with them.

Our growth has not been a rapid, but a sound one, and we are glad to see and know that this influence has done much for the State, and that it is spreading over our beautiful land. Ours has been a missionary work, and the results, money for the homes of the learners. I could point you to hundreds who today have fine young orchards growing that received their first inspiration from some member of this Society, or from our meetings or reports thereof.

THE FRUIT SEASON.

The almost complete failure of our apple crop this season has led many to think that we can no longer grow the apple profitably in our western country. But these climatic influences are not continuous and will not long remain, and the work must not be allowed to flag because thereof. When a horse is lame, he needs attention; when a cow is injured, she gets good care; when a person is sick, he must have proper treatment; so when our trees seem sick and barren, they must not be neglected. The proper care and attention must be more systematically given to our orchards when they show the need of it by their foliage or their lack of fruit. When we learn that trees can feel and suffer, we will more fully understand their needs.

THE SOCIETY A GROWING ONE.

The Society keeps growing and the local societies are increasing, notably the last one here in Columbia, with over 100 members. It is the influence of the societies and these workers that helps to make our State known throughout the country. Today we stand second to none in our influence, power and organization. This is shown by the reputation we have among the other State societies, by the growth of our planting each succeeding year, the demand for our reports, the information we distribute, the new fruits we bring into notice, and the opening up of new orchards all over the State.

INCORPORATION.

Our appropriation, as you all know, was granted as usual. Three or four visits were made to Jefferson City, and after consultation with the Governor, Secretary of State and State Auditor, it was deemed best, even late in the session, to introduce a bill incorporating our Society. A consultation was had with our Vice-President, the Chairmen of the Committee on Agriculture in the House and Senate, and a bill was introduced. With it was introduced a bill reorganizing the Board of Agriculture. This bill passed, and our incorporation was made by the act We have now to adopt a set of by-laws and we then proceed as usual. It seems to me that these should be adopted at this time. By this law our membership is confined to those who pay their dollar per year or hold life membership. I suppose we will have no authority to change this clause, as it is embodied in the act incorporating the Society. The act itself gives us a constitution, and our old constitution will be our by-laws as soon as adopted.

I wish to pay the compliments of this Society to the Secretary of State for his enthusiastic espousal of our cause. To him belongs the honor of saving the life of the Society and of its incorporation. He has long been a member of our Society, since its meeting at Lexington in fact, and has always felt a deep interest in our work, and every member can give allegiance to the Secretary of State. We shall always feel thankful for his valuable help in our time of need.

PRINTING THE REPORTS

The work on the last year's report was completed December 15, and the State printers could have begun the work soon after the first of January, had it not been that it seemed to be necessary to incorporate our Society.

Our Society had to be reorganized and a bill prepared the last moment to get through the Assembly, so that I could not obtain the order from the Printing Commission until March 30, because the bill had not become a law. It would be of much more benefit to the members could we get the report printed at once at the close of the year and not be compelled to wait so long for it.

House bill No. 717 (Secs. 10, 11 and 12), incorporating the Society and providing for it, provides as follows:

SEC. 10. The Missouri State Horticultural Society is hereby instituted and created a body corporate, to be named and styled as above, and shall have perpetual succession, power to sue and be sued, complain and defend in all courts, and to make and use a common seal and alter the same at pleasure.

SEC 11. The Missouri State Horticultural Society shall be composed of such persons as take an interest in the advancement of horticulture in this State who shall apply for membership and pay into the society treasury the sum of one dollar per year, or ten dollars for a life membership, the basis for organization to be the Missouri State Horticultural Society, as now known and existing, and whose expenses have been borne and annual reports paid for by appropriations from the state treasury. The business of the Society, so far as it relates to transactions with the State, shall be conducted by an executive board to be composed of the president, vice-president, second vice-president, secretary and treasurer, who shall be elected by ballot at an annual meeting of the Society; the Governor of the State shall be *ex officio* a member of the board—all other business of the Society to be conducted as its by-laws may direct. All appropriations made by the State for the aid of the Society shall be expended by means of requisitions to be made by order of the board on the State Auditor, signed by the president and secretary and attested with the seal; and the treasurer shall annually publish a detailed statement of the expenditures of the board, covering all moneys received by it. The public printer shall annually, under the direction of the board, print such number of reports of the proceedings of the board, society and auxiliary societies as may in the judgment of the state printing commission be justified by the appropriation made for that purpose by the General Assembly, such annual report not to contain more than four hundred pages. The secretary of the Society shall receive a salary of eight hundred dollars per annum as full compensation for his services; all other officers shall serve without compensation, except that they may receive their actual expenses in attending meetings of the board.

SEC. 12. The title of the act of 1891 alluded to in this act being defective, and the repealing clause therein alluded to having been omitted in the body of the act, and there being a necessity more clearly to provide for the Missouri State Horticultural Society, create an emergency within the meaning of the constitution; therefore, this act shall take effect and be in force from and after its passage.

EXHIBIT AT CHICAGO.

No one knows the worry and trouble about our exhibit at Chicago, except the President and myself. After two sets of plans had been agreed upon, they were rejected by the authorities in Chicago, and I was by telegram summoned to St. Louis only a little over a month before the opening of the fair to propose another plan for the display. This was done, and now we have in Chicago, after infinite delay and disappointment, one of the very best plans for display on the grounds, and one of the very best displays there. About twelve hundred jars, large and small, were filled last fall and summer with every variety of the fruits of our State, and are now on exhibition. A plan of the display is hereby submitted, and a cut taken from the picture of the fruits as they appear from a photograph.

Besides these twelve hundred jars of fruits we have in Chicago one hundred and fifty barrels of apples in cold storage for use on our tables. We will have these fine specimens on the tables until after apples begin to come again. These are all cleaned off every day, the rotten ones taken away and others put in their places. No one who has not undertaken such a work can begin to realize how much care and attention it takes to keep up such a collection. Our tables and fixtures are pure white and gold, and very nicely adapted to the display of both jars and fresh fruits, but in order to keep this in good shape and clean, calls for constant care and attention. About eight or ten barrels of apples are taken out each week or so, and an entire change is made in our fruits on the tables. Thus far we have to say gladly that no State, not even Illinois, with an appropriation of $25,000 for horticulture, can compare in variety, quality or quantity of choice fruits on the tables.

KEEPING UP THE DISPLAY.

Our success in the future with this display depends upon this Society as it has in the past, and I am sorry that we have not a greater number in attendance, that a little enthusiasm might be awakened in the collection and forwarding of the fruits this summer to keep up this display. But say you, "we have nothing and will have nothing that will be worthy of exhibiting on the tables of such a show as the one in Chicago."

You know the story of the clerk in the store when his master asked him if he could sell goods, and made answer, "yes, sir, I can sell goods to any one who wants to buy." "But," said the master, "it is not those who want to buy and will buy that I want a clerk to sell goods to, but it is those who do not want to buy that I want you to reach." Also, you know the story of the owner of the mill who questioned the miller who applied for a situation, "can you make good flour?" "Yes, sir, if I have good wheat I can make as good flour as any one " "But any one can do that," replied the owner. "I want some one who can make good flour out of poor wheat."

You see the application. We want some extra specimens of fruits this summer, and you answer that you could get them if the fruits were only good, but they are so poor. Any one could get good specimens when orchards are full of them, but we want good specimens when orchards are not full of even poor specimens. They can be found in the State, and it is to be your work to find them and send them to Chicago to the Missouri Exhibit, Horticultural building, Jackson park.

Now then, if the thousand correspondents and members of this Society will each spend one day only in collecting these fruits, what a work will be done.

ALL MUST HELP.

If you collect only a bushel of fruit each, see what we will have to use. If you have to go a long distance to find them, go and get them ; if you know or hear of any good orchards and cannot go, write me at once so I can go or send some one after them. This is our golden opportunity, and no member or fruit-grower in the State can afford to fail of his duty for maintaining the honor of his State. On you depends the success of this effort Directions and shipping tags will be furnished to all, and I have had occasion to make arrangements with the State Board of Agriculture to publish this call in an edition of 50,000 copies, which will go broadcast all over our State. On you, individually, will rest the responsibility of our success.

THE CAUSE OF FAILURES.

I cannot forbear to mention the success of fruit-growing and on what it depends. Our orchard failures, what causes them? The cold storms of one year ago blasted the prospect of a fine crop in a few days, and not only destroyed the crop, but badly injured the trees, so that they did not recover in time to form fruit-buds for this year's crop, for our fruit-buds are formed in June, and, that time past, our crop is gone for the next year. Even where the injury was not great and the bloom still formed in abundance, the exact repetition of the cold storm at the most critical time has again destroyed the crop more or less; in some places very badly, worse than last year, indeed; in others not so badly.

The years '92 and '93 will be long remembered by the fruit-growers as very disastrous ones, but proper care, the use of ashes, lime, salt, ground bone, and in some instances green or barnyard manure, will bring out our younger trees in good shape; but many old orchards are past their time, and may as well be taken out and new ones planted. I have this to say beyond chance of refutation: If the business be properly followed year after year, you cannot find any other that will pay you better, to say nothing of the increased value these orchards give to your farms and to the community in general.

OUR SOCIETY'S FUTURE.

About the success of our Society, a subject near and dear to my heart, I wish to say something. I speak the truth with pride when I say that at Chicago, where 26 State societies are represented, and where we find the best informed horticulturists of the land, I was glad to hear the compliment paid our Society as being the best in the country, and Missouri as making greater strides in horticultural progress than any other state in the Union. If there has been anything that I have been working for the last ten years, since I took the position I now occupy, harder than any other, it is to place this Society second to none in this great country. Hence, when these compliments were given the State, I am sure you will not blame your Secretary if the President and he took a sort of pride and satisfaction in them. Our growth has not been rapid, but has been on a good basis, and I look forward with pride to the future as full of hope, life and activity, and successes as well as failures. I wish that we had our usual delegation of over a hundred members present, at least to have seen Columbia, and to have given the people here a better idea of our strength and our work; but a busy season, rains and storms have so hindred our work that it has been almost impossible for fruitmen to leave their work, so that what we seem here is not what we are at home.

L. A. Goodman, Secretary,
Westport, Mo.

REPORT OF A. NELSON, TREASURER.

1892	EXPENDITURES.		
Dec. 14....	P. O. bill $10.92; express 70c; ribbon $4.95	$16 57	
	Program (printing) $22.70; plates $4.95	27 65	
	P. O bill $15.06; expenses of L. A. Goodman to Columbia, $17.35	32 41	
	Salary of Secretary for Nov.	66 69	
	Warrant No. 201	....	$143 29
Dec. 14....	Premiums at Columbia	90 00	
	Tablets and P. O. Columbia	8 80	
	Warrant No. 202	....	98 80
	Expenses J. C. Evans at Columbia	16 00	
	" N. F. Murray "	23 00	
	" Samuel Miller "	2 50	
	" A. Nelson "	17 85	
	" Miss M. E. Murtfeldt	25 00	
	Paid R. E. Baily, stenographer	41 00	
	Warrant No. 203	....	125 35
1893			
Jan. 2....	Ferd. E. Arn for bird collection:		
	Warrant No. 196.	40 55	
	Warrant No. 204	7 50	
			48 05
Jan. 9....	P. O. bill $8.74; Carthage press $2.50	11 24	
	Express $1.20; paper and twine $4.60	5 80	
	Expenses to Jeff. City, $13.55; salary Secretary for December, $66.66	80 21	
	Warrant No. 205	....	97 25
Mar. 3....	Carthage papers $2; P. O. January, $13.73	15 73	
	H. Speer (delegate), $8.80; salary Secretary for Jan. $66.66	75 46	
	Warrant No. 206	....	91 19
	Express $7.55; P. O. bill $10.22; type-writing $2.50.	20 27	
	Railroad fare and expenses to Chicago	31 10	
	Salary of Secretary for February	66 66	
	Warrant No. 207	....	118 03
April 15....	Expenses A. Nelson to Carthage: Warrant No. 208	....	13 20
April 17....	Mar. 15, railroad and hotel at Jeff. City	16 55	
	April 1 " " "	12 55	
	Telegrams $1.50; express $1.75	3 25	
	P. O. bill $23.80; salary Secretary for Mar., $66.66.	90 46	
	Warrant No. 210	....	122 81
April 18....	April 10, R. R. and hotel to Carthage, L. A. Goodman	12 50	
	April 15, R. R. and hotel Jeff. City, L. A. Goodman.	14 55	
	Telegrams $2.60; express $1.15	3 75	
	P. O. bill $16.30; salary secretary for April, $66.66.	82 96	
	Warrant No. 211	....	113 76
	Miss M. E. Murtfeldt, etomologist: Warrant No. 212	....	50 00

May 25....	R. R. and hotel to St. Louis, J. C. Evans..........	$19 50	
	R. R. and hotel to Jeff. City, J. C. Evans..........	16 55	
	Warrant No. 213..........................	....	$36 05
	R. R. and hotel N. F. Murray to Kansas City: Warrant No. 214..........................	....	9 20
	R. R. and hotel to Kansas City, A. Nelson: Warrant No. 215..........................	....	21 70
	Miss M. E. Murtfeldt: Warrant No. 216..........................	....	50 00
	Total..................................	....	1,138 48
1892	RECEIPTS.		
Dec. 6....	Balance on hand..................................	636 61	
14....	Membership fees from Secretary..................	24 00	
14....	From Nevada bank................................	36 19	
9....	Membership fees..................................	21 00	
1893			
Jan. 3....	Draft from State Treasurer.......................	416 39	
	Total..................................	....	1,134 19
	Balance Dr..............................	....	4 29

Mr. Chairman—Your Committee on Finance beg to report that we have carefully examined the Treasurer's report, and find it correct in every particular.

N. F. MURRAY,
GEO. B. LAMM,
A. CHANDLER.

Adopted.

REPORT ON SMALL FRUITS.

BY ARTHUR PATTERSON, KIRKSVILLE, MO.

It is practically impossible for me to attend the meeting in person, on account of the rush of work at home, having been delayed by the excessive rain-fall for several weeks past. I always enjoy the coming together of horticulturists and to hear the experience, the successes and failures of others that would otherwise, perhaps, require several years to find out. However much disappointed I am by not being with you in person, you can rest assured that I am with you in heart and mind, and the best that I can do is to send in a meager report on the small fruit in our section.

Our main crop of the small fruits is the blackberry, of which we use the Snyder altogether; having been quite successful with this variety, we have been slow to change to any other. They are in very fine condition at time of writing, coming out in the spring perfectly sound to the tip. They are now white with blossom, and promise a full crop, and in fact they have never yet missed a single year in bearing a full crop. The new growth is topped at about three and a half feet, which compels it to throw out laterals or branches from the main stem, and these are cut off at about twelve to sixteen inches from the main stalk the next spring before the growth commences. The fruit is borne on these branches, and they help to form a miniature tree by which the product of the plant is about doubled. It is important to top the new growth as soon after it attains the height of three and a half feet as possible, in order to give the laterals time to form and mature sufficiently to withstand the following winter.

It is also important to give thorough cultivation throughout the growing season. Should a continued drouth set in, the blackberries should be cultivated once a week, which will give a full crop of nice berries in spite of the drouth. All our bearing blackberries are in a 15-year old orchard where the trees are only 25 feet apart; hence they are pretty well shaded, but as they have borne some enormous crops, it is to be supposed that they do well in the shade; at any rate, we nearly always have better and larger berries than neighbors whose berries are in the open.

We are using three varieties of black raspberries, namely: Ohio, M. Cluter and Gregg, which have a succession of ripening giving greater ease in disposing of the crop. All these varieties passed the winter well and promise a fair crop of fruit.

The Shaffer's Colossal is by far the largest raspberry and is enormously productive. It winter-kills some every year but the dead part is cut out in the spring, and a full crop is the usual outcome. It is not, however, a good shipping berry, as it is too soft, and it is not admired by some for canning purposes because of its breaking up on being cooked. It is relished by all for dessert to be eaten fresh.

The strawberries promise only a fair crop. Formerly the Crescent held the leading place on our farm, but it is very unsatisfactory on account of the berries being so small at the close of the season. In planting one-half acre last spring we used the Bubach instead of the Crescent, using the Cumberland and Louise to fertilize with. A neighbor plants the Louise quite extensively, but they winter-killed quite badly last winter.

Cherries were mostly sound to the tip, except those planted on low or rather wet ground, which winter-killed badly. The same trees looked all right last fall, but many are dead this spring. I think I am safe in saying that it is absolutely useless to plant cherries on low. wet soil. All varieties blossomed out very full, but two freezes fixed them and now we have about one-fourth of a crop left. Have sprayed a few with London purple for the curculio as an experiment.

All varieties of plums blossomed out nicely and the fruit set out very finely. I sprayed them with London purple for the curculio, but found that I was too late, as the curculio had already worked on the Wolf quite badly. The Wild Goose, however, were not so far advanced, and I think by judicious spraying I can save quite a crop of them.

Apples are almost a complete failure, except Willow Twig and a few others, but taken as a whole we have a good prospect for a fair crop in the small fruit line.

Glasgow, Mo., June 6, 1893.

Mr. L. A. Goodman:

Dear Secretary—I send by express today one case containing 31 varieties of strawberries. Last week we had the promise of at least three-fourths of a crop, but the continued rains up to Monday morning cut them short, so one-half crop is about all we will have now. I am sorry I cannot send a better showing. If I could have selected them June 3, could have sent much better specimens. Most of the varieties are over their best. Gandy, as you will see, is very fine. and are the first we picked. We have plenty Grimes' and Burr's, but they do not grow any in size. I may be down to see you all the last evening of the meeting if I can. Hope you will have a good time.

Respectfully,

H. Schnell.

REPORT ON SMALL FRUITS.

S. MILLER, BLUFFTON.

The prospect here is about the poorest that we have had for years. Strawberries, most varieties are now ripening, and when compared with other seasons, make a poor show. Between late frosts, hail-storms and too much rain, they had a poor chance. Of the older varieties, the popular varieties are holding their own, and the new ones have not had a fair chance to show their merits, but they will be given, as they all had an equal chance. Beder Wood and Parker Earle stand at the head of the list of tried ones. Extra Early a failure. Evergreen so few berries that I cannot give it praise. Columbian may be valuable. Sucker, Jr., an improvement on its parent. Beal, from California, shows pretty well. Columbus, a very promising berry, good size, very productive, good in quality, and the finest berry I ever handled. Gen. Putnam got caught by the late frost, and has but few berries. Princess promises wonderful well; not yet ripe. Edith not yet ripe, but an enormous large handsome shaped berry. Bell, the largest size, productive and fine. Charlie not yet ripe. Tennessee Prolific just in blossom. Trimbell in bloom; plant vigorous and healthy. Greenville came too late to have a show. Swindle promises to be a valuable late one, and no swindle about it. Regina, another valuable late one. Crawford's L. D. is one of the most showy things in the lot. If present indications are carried out, it will be valuable.

This year is but a poor chance of giving an account of themselves. In a new bed some thirty varieties have been set out and all carefully cultivated, which may give us a chance to judge them next year.

Raspberries promised well until blooming, when the wet weather destroyed them, and now the prospect is not so flattering.

Blackberries shared the same fate.

Cherries—A pretty fair crop, but the curculio has been at work, and there will be lots of wormy ones by the time they are ripe. The May Bigareau are all gone. The birds take them before ripe.

Grapes—These look promising at this time, and if we can keep off the rot, will have a fair crop. The half hardy ones passed through the winter safe, and although the late frosts cut some of the early buds, and the hail knocked off many more, there is still a good showing. I intend experimenting on some of those vines that have fewest bunches, so as to get a second crop. I think it can be done without injuring the vines for the crop next season.

Plums—I almost forget these; in fact, there are scarcely enough left to deserve a notice. The trees bloomed well and some set their fruit, but nearly all fell off. The few left won't pay to spray, nor would it help much when it rains almost every day.

Taking these things into account, it is rather discouraging to the fruit-grower; but we must hope for a better crop next year.

At the close of the session the Dean of the Agricultural college presented a strong plea for the Society to make its home at Columbia and hold its summer meetings there. Every inducement was offered in the way of rooms, any thing that the Society needed. The Society took no action on the matter and left it for the winter meeting to discuss.

Strong invitations were presented from Trenton for the winter meeting, signed by the mayor, council and hundred of its citizens.

Also one from Fulton asking for the winter meeting. By motion the matter was left with the executive committee as usual, and the Society adjourned after a most pleasant and successful meeting.

MISCELLANEOUS PAPERS.

APPLE EXHIBIT AT THE WORLD'S FAIR.

Notes From the Field.

BY B. T. GALLOWAY, WASHINGTON, D. C.

Sterility of Pear and Apple Flowers as a factor influencing fruitfulness.

In the course of some investigations of pear blight carried on by the Department of Agriculture, it was shown that when insects were excluded from the flowers many varieties of both pears and apples failed to set fruit. This discovery led to experiments which seemed to clearly prove that most of our well-known varieties of pears and apples are practically self-sterile; in other words, to obtain a good crop of Bartlett pears, for example, it is necessary for the flowers to receive pollen from some other variety. A Bartlett pear flower fertilized with its own pollen, if it develops into a fruit at all, will be so different from the typical form as to be scarcely recognizable. The evidence at hand seems to clearly indicate that pollen from most of the well-known varieties will fertilize the Bartlett flower and produce typical Bartlett fruits. On the other hand, Bartlett pollen is thoroughly capable of fertilizing other varieties, such as Anjou, Winter Neelis, etc., the result being in every case the production of typical fruits of the kinds in question.

These statements are not based on a few scattered experiments; on the contrary they are made after hundreds of tests, extending over a period of nearly three years. The whole of the evidence at hand resulting from this work may be briefly summarized as follows:

(1) The majority of the cultivated varieties of pears and apples require cross-fertilization in order to bring about successful fruitage. By cross-fertilization is meant the transfer of pollen from a different horticultural variety, and not from a different individual of the same variety.

(2) Bees and other insects perform the work of cross-fertilizing.

(3) The weather at the time of flowering has an important influence on the visits of bees and other insects, and through these upon the setting of the fruit.

Horticulturists will see at a glance the practical application of the foregoing principles. No single variety known to be partially or wholly self-sterile should be planted in large blocks without introducing others known to be good fertilizers. Unquestionably the failure of many orchards to fruit can be traced to this cause, and the remedy in such cases is to introduce, either by top-grafting, budding or planting, varieties known to be active fertilizers. Of course, judgment must be used in the selection of pollenating varieties, otherwise there may be discrepancies in the time of blooming, which will render them valueless so far as the object in view is concerned.

PEACH YELLOWS AND ROSETTE.

Missouri is fast coming to the front as a peach-growing State, and for this reason the greatest care should be exercised in the matter of keeping out this crop's two worst enemies, namely, yellows and rosette. The former disease to a certainty extends as far west as Central Kentucky, and it is probably only a question of time when it will cross the Mississippi, if it has not already done so. Rosette, which is even more virulent than yellows, already occurs in parts of Kansas, but as yet it has attracted very little attention. This disease is causing the most serious trouble in Georgia, where it attacks both peaches and plums, killing the trees usually in about five months. Rosette in many respects resembles yellows, the principal difference being an absence in the case of the former of premature fruit, and a much more tufted growth.

No remedy for either yellows or rosette is known, but by proper precautions it is believed that regions now free from the diseases may be kept so. Briefly the precautionary measures we should recommend are as follows:

1. Procure no nursery stock from regions in which yellows exists.
2. Import no pits, buds or grafts from such regions.
3. Buy only from responsible nurserymen who have grown their own stock and cut their buds from healthy trees.
4. Destroy the first cases of yellows or rosette on sight, and continue the fight along this line.

For five years the United States Department of Agriculture has been experimenting with fertilizers to determine whether yellows could be prevented or cured by the addition to the soil of various fertilizers. "Potash, soda, magnesia, phosphoric acid, wood ashes, lime, nitrogen and other plant foods have been used repeatedly, separately and together, often in large quantities, and frequently on as many as 50 or 75 trees, healthy and diseased. Some of the diseased trees improved in appearance and probably lived longer than they would otherwise, but none of them recovered. Neither was it possible to keep healthy trees in a state of health." These experiments, therefore, carried on under widely different conditions and in the heart of the great peach region of Maryland and Delaware, seem to clearly indicate that yellows cannot be prevented or cured by the application of any of the usual forms of plant food.

Our Insect Pests.

Mr. L. A. GOODMAN, Secretary Horticultural Society:

I had made my plans for attending the meeting at Columbia, and am keenly disappointed not to be able to go, but alarming illness in my family for the last two weeks has not only prevented my attendance, but has incapacitated me from completing an essay intended for the evening program.

In the name of the Committee on Entomology, I would report that the present season has brought to the fore some fruit-tree destroyers not heretofore catalogued among our serious enemies. Among these is the Buffalo tree-hopper (*Ceresa bubalus*). This is a small, green, jumping insect, shaped, when in the perfect state, like an elongate beechnut, and is about one-half the size of the latter. It may be found on most fruit-trees and on many deciduous shade-trees, but its most injurious effects are seen on the apple. I had twigs sent to me this spring from a dozen different localities in the State, including the Northern, Southern, Eastern and Western divisions, bearing either the two or three inch-long rows of its fresh punctures, or having the bark scarred and blistered with the punctures of two or three successive years. These punctures are made by the female in placing her eggs, and greatly injure the vigor of the twig, even if they do not cause its death. When the eggs hatch, the small, soft, green, bug-like larvæ cause the leaves to turn yellow from the effects of the pricks of their myriad, tiny beaks in pumping out the sap. I am making some especial studies on the habits of this insect, and hope to be able to give a more complete account of it, and of the best remedies for it, ina succeeding report.

Another apple-tree pest not yet known to me was sent some weeks ago by Mr. Gilbert, of Thayer, who found it working under the bark of some young trees of Missouri Pippin. It caused the bark to shrink and harden in spots as large as a half dollar, and if very numerous would undoubtedly seriously injure the tree. The borer is a whitish, smooth sub-cylindrical lepidopterous larva, about a half inch in length by one-tenth inch in diameter. The head is broad and brown, and the jaws usually strong. It appears to be the young of some Tortricid moth, which I cannot place until it emerges. Mr. Gilbert sent two of these larvæ, but unfortunately for me, though it should be good news to apple-growers, one of these was parasited. The other has not yet completed its transformations.

A third insect which bids fair to prove very troublesome is the Twig-blight beetle (*Scolytus rugulosus*), a very small bark beetle which bores the buds and into the twigs of several varieties of fruit trees, but is most numerous and destructive on cherries and plums. This species has been sent to me by several correspondents and has already caused much loss in some of the cherry orchards of St. Louis county. The beetle is nearly cylindrical, blunt at both ends, of a dark brown color and only one-tenth of an inch long. It bores the buds and twigs in its perfect as well as its larvæ state, causing first a copious exudation of sap and later the shriveling of the twig. Of course no fruit matures on trees suffering from a bad attack.

The treatment of this insect is a difficult matter. A much diluted kerosene emulsion has been recommended as a spray, and it has been found that soap washes and soda will also keep it in a measure from the twigs. It is an imported pest, and has been reported from almost every section of the country. I shall report further in regard to these insects, and hope to find some efficient remedy for each.

Please invite the members of the Society to send me specimens of the insects which are found on their fruit trees or on any other trees and plants that may be suffering. Ask them to inclose these specimens in tin or wooden boxes, in which it is not necessary to punch air-holes, together with some of the wood, leaves or fruit upon which they appear to be working. I shall be glad to determine these species, and to help the senders to a remedy, if it is within my knowledge.

Wishing you and the Society a most interesting and enjoyable session, I am
Yours sincerely,
Kirkwood, Mo.
MARY E. MURTFELDT.

Plum-Tree Plant-Louse.

Editor "Rural World"—There is an insect working upon trees of the Wild Goose plum, which colonizes in groups on the leaves, feeding upon the sap. It is also found upon the fruit stems. What is the name of this insect, and what remedy is there for it?
Your respectfully,
N. W. P.
Pleasant View, Ill.

The specimens inclosed were those of the plum-tree plant-louse *(Aphis prunifolii).* The best remedy for this or other plant-lice is kerosene emulsion, for which the formula has been given repeatedly in the "Rural World," diluted with about 20 parts of water, and applied in the form of a spray. Another very good remedy is tobacco tea, made by pouring two gallons of hot water on a pound of tobacco, or tobacco stems and applying with a syringe. The trouble is that the aphis causes the curling or twisting of the leaves which protects it in a measure from contact with insecticides. Like all other aphids it has a number of natural enemies, such as lady-bird beetles and syrphus fly and lace-wing fly larvæ, which in the course of the seasons almost, but never quite, exterminate it. But these seldom come to the aid of the fruit-grower in time to save his crops.

MARY E. MURTFELDT.

Entomology as a Career.

The Study of Insects is Becoming a Very Important Business.

Economic entomology is that branch of the science which, looking beyond the mere collection and classification of insects, has to do with the control of those which injuriously affect agricultural products. Its importance is shown by the fact that its bibliography fills a volume of 450 pages, while the Association of Economic Entomologists numbers some 60 active members. That the achievements of its students or professors are remarkable is shown by the statement made in a recent address by the Dominion Entomologist of Canada, that a saving of $400,000 worth of agricultural products was made in North Dakota and Minnesota during 1891 by the adoption of certain measures recommended to farmers by official entomologists.

Entomology as a hobby is now widely pursued by young people, and no department of natural history is more attractive, says the "Youth's Companion." But the biologic study of insects, though of the first importance to the economic entomologist, is to him only the first step.

The life history of a given pest known, he aims to devise some means to control it. Some of the achievements in this line are, in a general way, well known.

The Colorado potato beetle is practically under the thumb of Paris green. The codling moth, whose larva infests our apples, is readily controlled by spraying the trees with the same poison at the proper season. So with many other pests of the farmer and fruit-grower. But as Prof. Riley estimates that one-tenth of our agricultural products is annually ruined by insects, it is evident that plenty of work remains to be done in this direction.

The total annual loss from insects in the United States is placed by the best entomological authorities at about $380,000,000. As the entomologists of the various state agricultural experiment stations and of the National Department of Agriculture pursue their investigations further, this enormous loss will be greatly reduced.

When their labors become better known and appreciated, their opportunities for work, as well as the means at their disposal, will be increased. Many more hands and brains will be needed to do the work, and young men and women trained in entomology will be called for as assistants.

Most of the states have now established agricultural experiment stations, and at the majority of these an entomologist is busily at work on his specialty. Some of the agricultural colleges give courses in economic entomology, and as the farmers learn to better appreciate its money value to them, they will devote more and more time to its study.

The implements needed for the collection and study of insects are few and inexpensive. For young persons whose happiness lies in outdoor life and the study of nature, no department of natural science offers a more inviting and promising field than applied entomology.—Colman's Rural World.

The Romance of Roses.

BY S. B. HERRICK.

[The following was taken from The Cosmopolitan as being worthy of place.—SEC'Y]

A traveler, passing through Persia, so the story goes, chanced to take into his hand a lump of clay. To his surprise, it exhaled a delicate perfume. "Thou art but a poor lump of clay," said he, "yet how sweet thou art. Whence comes this delicious fragrance?" The clay replied, "I have been dwelling with the rose."

The earliest records of the human race come laden with allusions to the rose. It is found in the mythologies and folk-lore of all peoples; it mingles with their religious rites, it crowns their fetes, it teaches and comforts through its symbolism, it plays an important role in their half mythical history. The oldest records of the past now existing in the form of written language are the Hindoo myths. Vishnu, one of these tells us, the Lord of the world, the God of life, one of the Trinity of "bright Aryan gods," discovered his wife, Pagoda Siri, in the heart of a rose. The Persian Ghebers say that when Nimrod commanded and their infant prophet Abraham was cast into the fire, the glowing bed of coals was turned instantly into a bed of roses, "whereon the child sweetly slumbered."

The poetical fancies of the Greek mythologies shadowing forth the processes of nature give to the rose a lover. Zephyr, the son of the dawn and the companion of spring, discovers the rose in bud; he caresses it with his wing, he breathes upon it with his sweet breath, till it uncloses to his wooing. Since that day the rose will only open in response to the sweet caresses of her wayward lover.

Jami, the Persian poet, following the same fancy, sings of the loves of the nightingale and the rose—the bulbul and the gul. "The nightingales warbled their enchanting notes, and rent the thin veils of the rosebud and the rose." In another place he says: "You may place a hundred handfuls of fragrant herbs and flowers before the nightingale, yet he wishes not, in his constant heart, for more than the breath of his beloved rose." The same poet, who seems never weary of heaping his delicate fancies upon the rose, says: "The rose appeared in Gulistan when the flowers demanded a new sovereign, because their drowsy Lotus queen would sleep at night. At first the maiden queen was white, but the nightingale, in the ardor of his love, pressed his breast against the encircling thorns and covered her delicate petals with his flowing blood."

Attar, a well-named poet of the rose, tells us in his "Book of Nightingales" that all the birds appeared before Solomon to make a charge against the nightingale for disturbing their slumbers by his warblings. Upon full examination of the criminal it appeared that the disturbing song was the uncontrollable expression on the part of the nightingale of his impassioned and distracting love for the rose. Solomon, whom a fellow-feeling must have made wondrous kind, inquired no further, but freely acquitted the culprit.

The rose, which by common consent of all nations was born white and thornless, has gathered around her numberless graceful and fanciful stories to account for her color and her thorns. Boitard, in his "Monograph on the Rose," tells us that Moses said, "Before the Fall roses were without thorns," but he does not add where he found this statement of Moses.

The ancients considered the color of the rose a question of sufficient importance to make it the subject of a poetical contest. Theophrastus and Bion, 300 B. C., each pleads for his own version of the story. Venus, fearing for her lover Adonis the vengeance of Mars, hid him in a thicket of roses.

> While the enamored queen of joy
> Flies to protect her lovely boy,
> On whom the jealous war god rushes,
> She treads upon a thorned rose,
> And while the wound with crimson flows,
> The snowy flow'ret feels her blood and blushes—

Is Moore's translation of a Latin epigram embodying the fable. Bion, in his famous idyl on the death of Adonis, says of Venus weeping over her wounded and dying lover:

Both tears and drops of blood were turned to flowers.
From these in crimson beauty sprang the rose,
Cerulean bright anemones from those.

Thorns are accounted for in an equally fanciful way. Cupid, stooping to kiss a new-blown dewy rose, was stung by a bee asleep in its heart. To please the petulant boy, Venus strung his bow with captive bees, and planted along the stem of the rose the stings torn from them.

Sappho, in one of the few fragments that remain to us of her epigrams, elegiacs and nine books of lyrical poems, sings the praises of the rose in an ode which has suffered translation at the hands of several poets:

If Jove should give the happy bowers
A queen for all their world of flowers,
The rose would be the choice of Jove,
And blush the queen of every grove.
Sweetest child of weeping morning,
Gem, the breast of earth adorning,
Eye of flow'rets! glow of lawns!
Bud of Beauty, nursed by dawns:
Soft the soul of love it breathes,
Cypria's brow with magic wreathes,
And to the Zephyr's warm caresses
Diffuses all her verdant tresses,
Till, glowing with the wanton play,
It blushes a diviner ray."

Anacreon, very nearly the contemporary of Sappho, 600 B. C., is fairly redolent with roses. One ode after another demands tribute of the rose to help the soft imagery of his verse, apart from those devoted specially to her praise.*

The proverbial expression attributed to Aristophanes, "You have spoken in roses," shows something of the feeling which the beauty-loving Greeks felt toward the flower.

Hippocrates, the god of silence, carries as his symbol a rose given to him by Cupid. From the idea of secrecy or reserve that associates itself with roses came the old custom recorded by the Greeks. When the people of the North, they say, wished to preserve the most profound secrecy in regard to what was said between themselves at their feasts, a freshly gathered rose was hung from the ceiling above the upper end of the table. It was considered not only dishonorable but a crime to reveal that which had been said "*sub rosa*."

Roses were dedicated to Venus as the symbol of beauty, to Cupid as the symbol of love, to Aurora, the rosy-fingered, to signify her office of opening the portals of day, to youth and springtime. In the exuberance of their love and loyalty, she meant to the Greeks all things bright, and fresh, and fragrant.

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*The forty-fourth and fifty-fifth odes, as translated by Moore.

A dainty story appropos of the rose is told by Boitard and Deslongchamp, the two French writers who have laboriously culled from classic and Eastern lore the myths, legends and stories concerning the rose, and who have been ruthlessly rifled of their store of sweets by most of the writers who have succeeded them, with little acknowledgment and less thanks. There was in Amadan, Persia, an academy whose statutes enjoined much thinking, little writing, and the least possible speech. Into this select society only a limited number of members were admitted. A famous Oriental doctor—Zeb by name—desired to become a member. Upon learning of a vacancy in the academy he made haste to come from his home to obtain his election. In the mean time the academy, like others since, had given away the membership to the most powerful applicant, not waiting to weigh the merits of the candidates. The learned doctor came too late, the last vacancy had been filled. The president of the assembly, covered with shame at having to refuse admission to a member who would cast such luster upon the body, was at a loss what to say. He therefore clothed his refusal in allegory, the polite way of saying disagreeable things in those days. A cup of water was brought in, filled to its brim, so that a single drop would cause it to overflow. The petitioner understood, and quietly turned to withdraw. A rose-leaf at his feet gave him an inspiration; he picked it up and placed it so gently on the water that not a drop was spilled. At this the assembly applauded, and the ingenious doctor was received by general acclamation among the silent academicians.

Vast rose gardens were planted on the hills near Athens, which supplied the flower markets of the day. And in the Græco-Roman colonies of Paestum and Sybaris the culture must have been carried to a very high degree of perfection. Ovid tells us that they were made to bloom twice a year by means of hot water, which—from testimony gathered from the literature of the day—must have been carried in pipes, much as is done in our hot-houses today. Pliny writes, about the date of the Christian era, "It is a flower known to all nations, equally with wine, myrtle and oil."

When the Egyptian Queen Cleopatra went to Cilicia to meet Marc Antony, she celebrated their meeting by daily feasts. During the first three days the richest tapestry and hangings, vessels of gold and silver, adornments of precious stones, all that the wealth and luxury and refinement of the world could supply, were lavished upon the entertainments. On the fourth day, as the crown and culmination of it all, she gave to him a feast of roses. The floors of the rooms and halls were covered to the depth of 18 inches with freshly blown roses, held in place by a strong but delicate net stretched above them so that her guests might walk over them. Nero, not many years later, gave a feast where $100,000 was spent in roses alone.

When the use of these flowers first came into vogue, the Romans were obliged to send to Egypt for them in the winter time. The advance in rose-culture is clearly shown by an incident in the days of Domitian, the last of the Cæsars, and Nero's immediate successor. The Egyptians proposed making a magnificent donation of roses to the Emperor, but the Romans laughed them to scorn. "In every street," says Martial, with reference to the proposed gift, "the odor of spring is breathed, and garlands of freshly gathered flowers are hanging. Send us corn, O, Egyptians! and we will send you roses."

Latinus Pacatus, reproaching the Romans for their luxury, said they were not satisfied till they had reversed the seasons, having roses in winter wherewith to crown their cups of wine, and ice in summer to cool it. Martial says: "The moment for soliciting a favor is when the patron is entirely given over to the pleasures of the table and *roses*." As the stern conquerors and law-makers of the earth fell from their high estate, and their martial valor was quenched in luxury, their passion for the use of roses grew; they crowned the statues of their gods and heroes with them, they scattered the petals through their temples. At feasts the floors and couches were fragrant with fresh blossoms, the vessels from which they drank, and the heads of the guests, were wreathed with them, and the petals were thrown into the cups from which they drank the vaunted Falernian wine. On the occasion of certain water parties given at Baiæ, the whole lake of Lucina was covered with roses, which parted before the moving boats and closed after them as they passed.

Lucius Verus reached a luxury in the use of the rose never surpassed before or after his time. He slept upon a couch covered with cushions made of a fine, thin net, and filled with freshly gathered rose-leaves. The extreme fastidiousness of the young Smindyrides, the Sybarite, whose sleep was disturbed by a crumpled rose-leaf, has passed into a familiar proverb.

So enormous a demand created, of course, its commensurate supply, and acres upon acres of ground were devoted to their cultivation. The sale of flowers has always been intrusted to the most beautiful women. Some of the Roman poets have immortalized the names of these charming rose-venders. It is altogether probable that Flora, or Chloris, the goddess of flowers, was one of the earlier and more charming of the flower-girls who had been apotheosized by some admiring poet. Gallants among the young Romans were in the habit of presenting roses to the belles of the day, and *mea rosa* was a term of endearment used by the Roman lover to his betrothed.

In the third century, when Heliogabalus, the beautiful long-haired priest of the sun, was called from serving the altars of Baal in Phœnicia to the wearing of the imperial purple, his extravagances left behind all those of his predecessors and drained the resources of the empire. His gorgeous dresses, golden ornaments and precious jewels were thrown aside after a single wearing. His floors were scattered with gold dust and covered with roses. His porticoes and couches and beds were strewn with them. Through the four years of his mad career the pathway that led to his violent death was literally strewn with roses.

Symbolism is one of the earliest tendencies of national life. All the objects and processes of nature have some hidden significance and are associated with the faith, the joy, the sorrow of every-day life. The rose has always associated itself with the sweeter humanities of life. Though it blossoms through mythology, folk-lore, history and literature, it is as a wholesome, earth-born flower, not associated as the lotus has been with superstitious rites and transcendental analogies; not with crowned ambition, like the laurel and the bay; not as a symbol of funereal woe, as the yew and the cypress. Here and there a story or legend brings it in touch with sorrow, with superstitious fear, with evil; but even then it rather symbolizes the clinging hope that will accompany the deepest human misery itself. Tulips and orchids have lent themselves to speculation, and been bought and sold in mad emulation with as little sentiment as if they had been mere stocks and bonds. But until the present day the rose has shaken herself free from all contaminations of such associations whenever they have chanced to come near her. In spite of the prices that special fashionable roses have brought of late, nothing seems to be able to vulgarize the rose, or spoil the sweet graciousness that belongs to her. She still stoops to the humblest home, and no life is so poor or barren that she is not ready to sweeten and illuminate by her presence. She stands today as she did among the Greeks and Romans: the queen of love and beauty; the type of full, sweet human life, of jocund youth and happiness.

After the Christian era and the Church had been fully established, a great effort was made by the fathers to suppress the use of flowers, both in religious ceremonials and for personal adornment, as having been so closely associated with pagan rites. Tertullan wrote a book against the use of garlands, and Clement of Alexandria argued that the secular use of roses was unbecoming a Christian. "Kings should not be crowned with roses, since Christ had worn a crown of thorns." But the love of flowers was too strong for ecclesiastical denunciation, even when that was at high-water mark, and Christian and Pagan alike continued to use them in worship, at feasts, and in private life.

In the village of Salency, not many miles from Paris, a curious fete was inaugurated in the year 480, which has survived until the present century. Medard, Bishop of Noyon, instituted the ceremony of publicly crowning with roses the most modest and virtuous maiden in the village. The young girl was to be named for this honor by public acclaim. To support the necessary expenses of the festival, the bishop set apart a portion of his domain, which part was called the *Manor of the Roses*. The first young girl selected by the community was the Bishop's own sister. During the reign of Louis XIII, the king was in the vicinity at the time of the yearly ceremony, and desired to grace it with his presence. Being ill, he could not himself attend, but he sent his blue ribbon and a ring, saying: "This has long been the prize of honor, it shall now become the reward of virtue." Since that time each year La Rosiere has received the ring.

In 1773 this festival was the occasion of a very serious legal process. A new lord having purchased Salency attempted to take away the time-honored right of the inhabitants, by himself naming three candidates for the rose. He assumed this right with the estates, and attempted to suppress the ceremonies and reduce the expense. The inhabitants made complaint to the Court of Chancery, which at once decided in favor of the people and set aside the pretensions of the new-comer. But, tenacious of his supposed rights, the owner instituted a civil suit before the parliament of Paris. This august assembly gave a decree confirming the people in all their rights and ancient customs. The contumacious lord, for his pains, only received an order to pay all the expenses incident upon the festival out of his own pocket.

The oldest rosebush in the world is at Hildersheim. It was planted more than a thousand years ago by Charlemagne, in commemoration of a visit made him by the ambassador of the Caliph Haroun-al-Raschid, of "Arabian Nights" fame. A few years afterward, when Louis the Pious, the son of Charlemagne, was hunting in the neighborhood, mass was said in the open air. On returning to his home the officiating priest found that the holy image was missing. Returning to the spot where mass had been said, he discovered the missing image in the branches of a wild-rose tree. As it miraculously evaded his grasp, he went back to Louis and his suite and told them of the wonder. They all rushed to the spot and fell on their knees before the miraculous bush. A cathedral was built above it, its roots being enclosed in a sort of coffin-shaped vault, under the middle altar of the crypt. This crypt was built in the year 818, and with the rose-tree it survived a fire which destroyed all the rest of the cathedral in 1146. The roots are over 1000 years old. The rose plant was, when described a few years ago, still living, and blooming profusely, and was 26 feet high, covering 32 feet of wall, though the stem was only two inches in diameter.

A curious custom in the Italian city of Treviso is recorded. A mimic castle hung with rich carpets and silk was erected and "manned" by the maidens of the city. Their weapons of defense consisted of roses, rose-water and other equally delicate missiles. The fortress was attacked by a bevy of young men, armed with like odoriferous projectiles. The German emperor, Barbarossa, in the middle of the twelfth century, made one of the attacking party, and declared himself delighted with the sport.

Elizabeth of Hungary, the heroine of Kingsley's "Saints' Tragedy," has a legend told of her which is a little doubtful, as a tribute to her truthfulness and conjugal loyalty. She was a very gentle and tender saint, devoting herself to the care of the poor. She was wont to take long and toilsome journeys on foot, carrying them aid and relief. This was evidently against the wishes of her husband, for it is related that as she was one day going by stealth with her favorite maid on one of these errands of mercy, she met her liege lord as she was climbing up a steep road, bending under the load of provisions concealed under her cloak. He demanded peremptorily her errand. Some of the writers say that she answered "Roses;" others that her husband, not waiting for a reply, threw open her mantle. Instead of what he expected, he found she was laden down with a lapful of the most exquisite red and white roses. The blessed angels, who have in Catholic legends a decided preference for charity over the other virtues, had spared her a conjugal rebuke by miraculously changing her clandestine charities into roses.

The "Romaunt of the Rose," the delight of Philip the Fair, is the longest and most important of the works of the Trouveres of France. It was begun by Guillaume de Lorris, who died in 1260, and finished by Jean de Meun some 50 years later. It was written in verse, and in the allegorical form affected in that day. The story is of a lover who becomes violently enamored of a rose whose reflection he sees in a well (they did not fall in love in those days, but became enamored). He sighs, he is restless, he becomes agitated, he seeks to possess himself of the coveted treasure, he encounters all the allegorical virtues, dangers, temptations and alarms, under the guise of minutely dressed ladies and gentlemen; he finally obtains the long-sought flower, but, alas! the treasure is no sooner his than its charm vanishes, he cares no longer for its beauty and the fragrance it exhales. He neglects it in disgust, and finally abandons it. And then comes the inevitable moral! That portion by De Lorris is full of sweet imagery and poetical thought, but when the witty and versatile Jean de Meun takes up the tale, "the allegory becomes a satire, and the aroma of poetry dies out of it with the fragrance of the forgotten rose." All this requires 22,000 verses for the telling. It makes one "envy the secular leisure of Methuselah," as Lowell says in another connection.

This "Romaunt of the Rose" had peculiar charms for Chaucer, the poet of spring, who finds his way naturally to the roses wherever he may be. He made a translation of that part by De Lorris, and about one-sixth of De Meun's conclusion, condensing it from 22,000 to 7700 verses. The eglantere of Chaucer, "that gave so passing a delicious smell," is the single sweet-briar rose of England; with the later poets this flower becomes the eglantine.

In the German "Book of Heroes" there is a story of a rose garden at Worms surrounded by a single silken thread. The Princess Chrymhilde promised to each knight who should successfully defend it, and slay an attacking giant, a chaplet of roses and a kiss. Hildebrandt, one of the knights, took the roses, but declined the kiss. Another, a monk, not only took the kiss, but sued for one apiece for all the members of his fraternity. To this the Princess consented, but only after the valiant monk had "fulfilled his tale" of giants, one for each kiss. Indeed, the lyric poets from Anacreon to the present day have reveled in roses. and the subject has become no more threadbare with much handling than is the love they symbolize.

In 1366 Pope Urban V, wishing to bestow upon Jeanne, queen of Sicily, a particular mark of his favor, instituted the ceremony of the benediction of the rose. A golden rose was made; it was in the form of a rose to intimate how fragile and evanescent is this human life, and constructed of the indestructible and incorruptible metal to indicate the immortality of the soul—so say the soothsayers of the time.

The rose was solemnly blessed in the sacristy, with incense and holy water, with balm and musk. The Pope went afterward to his chapel, carrying in his left hand the golden rose which had been presented to him by a cardinal deacon, while with his right hand he gave the accustomed benedictions to the faithful. When the chapel was reached he handed the rose to the cardinal again, who in his turn handed it to a subordinate to be placed upon the altar. Mass was then celebrated by a cardinal priest, assisted by the bishop of the holy college, arrayed in a rose-colored chasuble. A decree was made by Urban V that his blessing of the golden rose should be repeated every year. After the benediction the Pope made a present of the blessed rose to some church or sovereign to which he wished to show special favor. If the recipient was not present, which was usually the case, the rose was sent to him by the hand of a cardinal or officer of the pontifical court. According to some authorities this was done on Good Friday, to others on Mid-Lent Sunday, which is called Rose Sunday.

In the fifteenth and sixteenth centuries there are some curious records, which are a little hard to interpret, in regard to the value at which roses were held. Sir William Clopton granted to Thomas Smith a piece of land in Hampstede, "for the annual payment of a rose—at the Nativity of John Baptist—to Sir William and his heirs, in lieu of all services. Dated at Hampstede on Sunday next before the Feast of All Saints, 1402." Again, "in 1576 Richard Cox, Bishop of Ely, granted to Christopher Hatton of a certain valuable property, for twenty-one years, tenant covenants to pay on Midsummer's day one red rose for the gate-house and garden, reserving to himself and his successors free access through the gate for walking in the garden, and *gathering twenty bushels of roses* yearly." The only explanation of this, in view of the last and italicized clause, is that the transfer was for some unknown consideration, and the rose paid as nominal rent, as is often done nowadays, to meet some requirement of the law. And yet the fact that vassals in those days were required to contribute sometimes a bushel of roses to their liege lord yearly, for the manufacture of rose-water, looks as if they might have some recognized commercial value. About this same time roses, in France, could only be grown by royal permission.

Marquis de Chesnel tells in his "History of the Rose" that one of the old customs of the provinces in noble families was that a father who had both sons and daughters gave his property to his sons, and to his daughters, as a marriage portion, a wreath of roses.

A very remarkable fact of history shows the estimation in which roses were held in the early ages. Until the days of Richelieu there existed in France a very singular custom, the origin of which is lost in the dimness of early history. The peers of France, the dukes, and even the kings and queens of Navarre, all who owned the French sovereign as suzerain, were obliged to present roses to the parliament of Paris in April, May and June. Some one of the peers was appointed to perform the ceremony, evidently in the presence of the others. The noble called to the position of honor scattered roses, violets and fragrant plants through all the chambers of Parliament; and, before the audience, the president, councillors, and even the lower functionaries, met at a splendid breakfast. As the rose scatterer went through each chamber, before him was borne a great silver bowl full of as many bouquets as there were officers present, and above his head, carried high over his armorial bearings, was an equal number of wreaths.

He was given audience in the great chamber, where he assisted with the entire Parliament at mass.

During the ceremony, the audience time excepted, there was a concert of hautboys; the players of these instruments afterward serenaded the presidents before their dinner hour arrived. "The presentation of roses was for all those of the peers who had the right to attend the Parliament of Paris."

During the reign of Francis I, there arose a dispute between the Duc de Montpensier and the Duc de Nevers upon the right of scattering the roses. Parliament gave precedence to the Duc de Montpensier, as being prince of the blood, although the Duc de Nevers was the more ancient peer. This fact throws some light upon the ground on which the rose scatterer was chosen, and the dignity of his office. Among the princes of the blood who took part in this ceremony, acknowledging vassalage, were the Ducs de Vendome, de Beaumont, de Angouleme and many others. Even Antoine de Bourbon, King of Navarre, vassal in right of his title as Duc de Vendome, submitted himself to it. Henry IV, while he was still King of Navarre, was absolved from the necessity of performing this act of fealty to the reigning King of France by the procureur-general; but he required it of his subjects all the same when he was elevated to the French throne. This singular ceremony was kept up till some time in the seventeenth century. At this time the Parliament of Paris had a regularly appointed officer of the court, "Rosier de la Cour" by title—a sort of lord high keeper of the royal roses.

It is curious that the rose has seemed to establish herself independently among all nations as the symbol of love and joy and innocence, and no less curious that here and there, where there is an exceptional use or symbol, they are the exact opposite of the rule. In 1284, while the Christian synod was in session at Nismes, each Jew of the city was required to wear a rose upon his breast, as a mark of dishonorable distinction. And at one time, in Germany, a crown of roses was worn as a punishment for immorality—this last, perhaps, in contradistinction to our Lord's crown of thorns.

The Feast of the Rosary of the Blessed Virgin, the first Sunday in October, was instituted in commemoration of the successes of the Christian arms against the forces of Solyman the Magnificent, especially of the battle of Lepanto. Though all Europe was thrilled by the great naval victory, it has come down to us mainly as associated with the most picturesque figure of that age, the unhappy Don John, of Austria, and its greatest literary light, Cervantes. It was by this battle that the great Spanish romancist lost a hand, and the world, perhaps, gained a "Don Quixote." The Feast of the Rosary was named from the Virgin Mary, the "mystical rose" of the Catholic church. The name has been transferred to the chaplet of beads, by which, without the necessary interruption to devotion which counting would create, the sayer of the one hundred and fifty prayers can keep record of their number: ten *Ave Marias*, and after each ten a *Pater Noster*, marked in the rosary by a large bead.

Roses have been borne on the escutcheons of certain noble houses from the remotest time. They were bestowed upon Roman generals as marks of honor, and so descended in the family coat-of-arms. Luther adopted the rose as his device and had it engraved upon his signet. The Free Masons, evidently from its associations with secrecy, also use it.

The best-known use of the rose in this way is as the national emblem of England, perhaps from the union of the red and white roses of the houses of Lancaster and York.

When royal honors were being shifted back and forth between Henry VI, of the house of Lancaster, and Edward IV, Duke of York, the two roses, the insignia of the rival claimants to the throne, came prominently to the fore, and gave the name to the wars of that miserable, confused portion of England's history. The origin of the red rose of Lancaster lies far back in history; the white rose of York was chosen in contradistinction to the insignia of the rival house.

In the reign of Edward I, of England, his son, the Count of Egmont, had taken as vassal to the French King the title of Count Champagne. His predecessor in this title was the celebrated Thibaut, whose name was so closely associated with that of Blanche of Castile, the mother of Louis IX. The feeling was so strong against him after the death of Louis VIII, that he was forced by public opinion to go on a crusade. From the East he brought back the rose of Damascus on his shield as insignia; the rose itself was brought back from Syria by one of the *preux* chevaliers of that time, and domesticated in Europe. When the English prince came back from service under the French king, he had assumed Thibaut's rose with his title and other possessions, and from him it descended to the house of Lancaster, of which he was head.

At the baptism of the poet Ronsard in 1524, a large vessel of rose-water was prepared for the purpose, as was sometimes done in those days. On the way to the church, by some accident, the nurse let the baby fall, and as the good angels would have it, he fell upon a heap of roses. At the same moment, by another accident, the attendant who was carrying the basin of rose-water spilled it upon him. This, his biographer seems to think, accounted for his later success as a poet. The Academy of Floral Games, at Toulouse, gave as a prize each year a golden eglantine for the best poem composed upon a given subject. The first prize was received by this same poet, Ronsard. Instead of a rose they gave him, as being more worthy of his merits, a silver image of Minerva. Mary, Queen of Scots, however, made up the deficiency, if there was any, for we find her sending the poet a rose of silver valued at 500 pounds.

When Henry of Navarre, then Prince of Bearn, was a boy of 14, his cousin, Charles the Ninth, came to pay him a visit at Neva. The days were spent in sports which both cousins loved, and festivals of various kinds. Charles was devoted to archery and considered himself *facile princeps* in the art. A contest of skill was arranged, and the two young princes with their retainers met at the appointed time. An orange, which had been selected as the target, was set up. On the first trial Henry was successful and carried off the orange. According to the rules of the sport, the victor in the first trial was entitled to the first shot on the second. He stepped forward, bow in hand, to take his shot, when he heard himself sharply ordered back by the angry and mortified king. The boy obeyed, but turned his aim upon his monarch's heart. The redoubtable Charles hastily sheltered himself behind his largest courtier, calling out to his followers to "take away that dangerous little cousin."

The following day, peace having been restored, Charles found an excuse for absenting himself from the shooting match. The Duke of Guise, who was present and seemed to fear his youthful antagonist, as much as his royal master did, tried to avoid the contest by breaking open and throwing away the orange which was to serve as target; no other being found, the contest of skill promised to end there. The young prince, nothing daunted, determined not to be entirely cheated of his sport, plucked a rose from the dress of a pretty young villager standing by, and fastened it up, calling upon his unwilling rival to shoot. The Duke of Guise, deprived of his last resource in the way of a subterfuge, shot and missed. Henry stepped coolly forward, drew his bow, and the rose fell, pierced through the heart with his arrow; picking it up he handed it, with the arrow sticking through it, to the blushing girl from whom he had taken it.

In more modern times roses have been much used in religious festivals, not merely with other flowers and plants. For instance, at the *Fete-Dieu* rose petals are scattered in the air, blending with the smoke of the swinging censers. Our excessive use of flowers at funerals is the outgrowth of their occasional use, in the case of children and young girls, in a more or less remote past. There is a custom, in the valley of the Engadine in Switzerland, when a man is accused of a crime, and is able, on the same day, to justify himself from the charge, he is at once liberated, met and presented with a white rose, by a young and beautiful girl, the blossom being called *the rose of innocence.*

Not more than a century ago a society of literary men was formed in Paris, who called themselves *Societe des Rosati.* They assembled in a place called "Eden, or the thicket of Roses." In order to become a member, it was requisite not only to be a joyous and convivial spirit, but also to have sung of the rose.

The name "rose" comes directly from the Latin, and through the Latin from the Greek. In its first form it is supposed to have been derived from the color red. In its different forms it has given its name to many lands. Syria or Suristan is thought to be derived from the name of a beautiful and delicate species of rose, the Suri, which grows in that country. Gulistan comes from the Persian name, Gul, rose; and Rhodes, the island made so famous by the valiant defense against the Turks by the Knights of St. John, means the land or the place of roses.

The rose has popularly been supposed to be indigenous to Oriental countries. "Born in the East, it has been diffused like the sunlight all over the whole world." Æsop told the gardener of his master Xanthus, that "the earth is a step-mother to those plants incorporated into her soil, but a mother to those which are her own free product." Where the wild-rose flourishes, there all other roses will grow. And the wild-rose, in spite of so much prating to the contrary, seems to be indigenous to all the world, in the temperate zones, except Australia and South America. These countries are among the youngest continents of our earth geologically, and the Rosaceæ are the latest comers in time. It had not become rose time with them when man came. The Rosaceæ include, besides roses, most of the hardy fruit-trees and plants, the apple, peach, pear, plum, raspberry, strawberry, blackberry, as well as many ornamental shrubs.

The genus Rosa, Darwin says, is a notoriously difficult one. From time immemorial roses have been artificially or naturally crossed, till it is almost impossible to name species and varieties. As an illustration of the rapidity with which new varieties are formed, a case is cited where some wild Scotch roses were transplanted into a garden. At the end of 20 years, by selection, but with no fresh kinds, 26 well-marked varieties were found, and within 50 years 300 varieties had come from the same species, of various sizes and all colors, yellow, white, pink, crimson and variegated. It is a well-known fact in evolution, that after great changes have been produced by crossing and recrossing, there is a tendency both in the animal and vegetable world to a reversion to the original type. In this way, when the origin of certain forms, now common, has been lost in the obscurity of the past, it is often made clear by such a case of atavism. New varieties are made in several ways—by crossing, by bud variation, and by grafting buds—these last being very rare. Crossing is simply effected by placing the pollen of one variety across the stigma of another. The seed which is the result of this process bears a resemblance, more or less marked, to both parent forms. Bud variation is when, from some unknown cause, on a single branch some new form will arise, which may be retained by careful cultivation. Graft hybridization occurs in rare cases where, just at the point of juncture between the grafted branch and the stalk, a shoot arises which partakes of the character of both stalk and graft.

The moss-rose is undoubtedly a case of bud variation from the old-fashioned Provence rose. Moss-rose trees have been known to bear perfect Provence roses with no sign of moss upon them, and Provence rose-trees to bear moss-roses in the same way. Such bud variations when very singular are called *sports*; the white rose called the Bride, for instance, is a sport from the Catherine Mermet. D'Orbessau, in his "Essay on the Rose," states that he saw *blue* roses growing wild, near Turin; other writers profess to have seen and grown blue roses. But these were probably purple, a color often confounded with blue by people whose calling has never trained them to discrimination in color. A law has been discovered in vegetable physiology in regard to color, which is, that varieties of the same species do *not* exist in all the three colors, yellow, blue and scarlet. Occasionally, by manipulation or accident, such a sport occurs, or is approximated; but the variety is not stable, is not a well-established variety that can be propagated. This law is not a bad thing to keep in mind in buying rare plants.

Haj, a Moorish floriculturist of the middle ages, states that his people knew how to delay the blooming of roses, to keep them in the bud, and gives an elaborate recipe for producing blue roses, by putting a brilliant blue pigment under the pellicle that covers the roots, binding up the wound in oil, and then watering with indigo water.

The extremely double roses of our day have been made by constant culture, enriching the roots, and supplying artificial conditions favorable to growth. The stamens are—many of them—by these processes converted into petals. Sometimes by examining the heart of double roses a petal will be found half stamen, only half converted.

The rose played a very important part in the pharmacopœia of the past. Oil of roses, conserves of roses, preparations from the leaves and from rose-galls were used as specifics for headaches, nerve troubles, tumors, indigestions, and even hydrophobia—from which comes the name dog-rose. One author, Hermann, says that this flower will cure all known maladies, and "all the pharmacopœia should limit itself to the rose." They were used in embalming the dead as well as toward the preservation of the living.

Rose-water is spoken of by ancient writers, but it is not the same thing which we call by that name, for until alembics were introduced in the eighth century distillation was unknown. In 1128, when Saladin reconquered Jerusalem, he would not enter the mosque of the temple, which the Christians had in the mean time been using for worship, till it had been thoroughly purified by washing it with rose-water. This required 500 camel loads of the fragrant liquid. The same thing was done when St. Sophia was taken from the Christians, before it could be made fit for Moslem worship.

The rose-water of modern finger bowls has its prototype in past usage, for in an account of expenditures for a dinner held at the university of Oxford in 1570, the item is introduced, "for rose-water to wash afore dinnere and after dinnere, iijs ix*d*." A bottle of rose-water was sent as a New Year's gift to Bloody Mary in 1556, showing it to be rare at that time in England; and in fact we know that roses were not common in England before the seventeenth century.

The best-known product of roses today is perhaps the attar, of which we now have so many fair imitations at very low prices. It has always been considered of great value, at times the pure attar being worth eight times its weight in gold. Many authors have believed that this perfume was known to the ancients. They have indeed quoted Homer to show that it was known in his day, especially that passage in the "Iliad" which says that Venus preserved the body of Hector, after his death, by covering it with "the divine oil of roses." If this were a legitimate conclusion from the text, other authors would certainly have mentioned its existence, especially Pliny, who minutely described the perfumes of his day, which was about the time of the Christian era.

Until the sixteenth century we have no authentic mention of attar. The story of its origin is told in the history of the Mogul empire. The Sultana Nourmahal, the Light of the Harem, during a feast which she gave to the Grand Mogul Jehanguir, caused a canal to be filled with rose-water, where they bathed in its perfumed water, and floated about over its surface.

After some days a curious substance was observed on the surface. Upon examination it proved to be the essence of the roses, which the heat of the sun had caused to gather on the top of the rose-water, and the delicious fragrance induced them to turn this accidental discovery to account.

Since that day roses have been cultivated in Persia, in India and in Turkey for the manufacture of the essence. The garden of Gulistan is five days' camel ride from end to end, and in Ghazipur and Roumelia hundreds upon hundreds of acres are planted with roses. There is an attar sold at a low price made in Europe. The French mode of preparation is that merely of boiling the petals of the damask rose in lard; this takes up the perfume, which is then extracted. The attar of commerce is not always extracted from the rose itself, but sometimes from the foliage leaves of the rose geranium.

While in different parts of the east great quantities of roses are grown for their essential oil, the province of Roumelia is perhaps the most important center for the industry. On the lofty plain bounded on the north by the Balkan Mountains, are planted the great rose gardens, where the finest attar in the world is made. Kasanlik, the center of the district, means in the Turkish tongue place of boilers. The roses are planted by the farmers of this district on sloping ground facing the sun, and where the soil is sandy. Laying down a rose garden may be done in the spring or fall, the ground being cleared of weeds. Young rose shoots are torn from the old plants, so as to carry with them a part of the roots. These are laid almost horizontally in trenches five feet apart. In six months or so the shoots appear, and are earthed up, and in almost a year the plants stand like young hedges, about a foot high. It is not till the end of the third year that the blossoming is of any importance. At the end of the fifth the plants are in full bearing, and they continue blooming for fifteen years longer. It does not do to enrich the soil too heavily, as it injures the quality of the essential oil quite as much as it improves the quantity. Hoar frost, fog and dampness are very injurious; in 1870 all the roses in this district were killed.

In May, when the gardens are a sheet of bloom, the harvest begins. The roses are of several kinds, but all single, or nearly so—pale pink or white, and very much like our wild roses. Early in the morning the pickers begin, while the dew is on the flowers. The petals are taken from the stalks, and at once put into great copper alembics, capable of holding about 240 pounds of water. Into each of these alembics, with their downward-pointing nozzles, are put 180 pounds of water, and 25 pounds of rose-leaves. This is then distilled till the turbid rose-water amounts to 25 pounds. The boilers are emptied, cleansed and the process is repeated. The turbid fluid is again distilled, and then allowed to remain at rest. On the surface of this double-distilled rose-water the precious essential oil rises like a greenish or yellowish scum. This is skimmed off by means of a conical spoon, with a small hole in the bottom to allow the water to run away. The appliances are all very rude, and there must necessarily be much waste in a material so precious. According to estimates made at Kasanlik, it takes about 4000 pounds of roses to make one pound of oil. And from 4000 to 6000 pounds of roses are the largest crops raised upon an (English) acre of land. The price for the pure attar is about $4 per ounce.

Most of our most beautiful and successful roses come from England, where the prices asked for new roses are moderate—$2.50 retail and about $1 apiece by wholesale, for a plant, being the usual price; while the French roses, about 50 new varieties of which come from a single establishment each year, average double that amount. Out of these 50, 49, perhaps, prove of little worth and are cast aside. This may be due to the unsuitableness of our climate, if they are used as bedders, or to the variety not being prolific, or to its being unfitted for early forcing, if for hot-houses.

One of the foremost rose culturists in the country tells me that he invested $1500 in the much vaunted and beautiful rose, Her Majesty the Queen. He bought 1000 plants at about $1 a plant when the retail price was $2.50, and his money was sunk, lost! The rose proved suitable neither as a hot-house nor as an out-door rose, and probably would not do so north of the parallel of Charlston, S. C. And yet the blossoms of this rose sold once for $5 each, when he held probably the monopoly of it.

Roses have for several reasons never attained the prices reached by tulips and orchids. They are not the luxuries of the rich so much as the heritage of the race. Great sums of money have been spent upon roses, and lost; but it was by the addition of smaller sums that the aggregate became large. A single plant rarely brings over $3; but a large sale of any variety proving a failure will, of course, be a serious loss, even at ordinary rates. Risks are constantly being taken by florists, with the necessary consequences. The big stories in the newspapers are usually without any foundation in truth.

The reason why no rose ever brings such a price as many an orchid does is, that the propagation of orchids is slow and doubtful, while a rose may be multiplied almost indefinitely, and that quickly. No one would be so foolish as to pay $2500 for a rose (as was done lately for an orchid), when the next year the market might be flooded with the same variety. Rose plants are high priced while they are new; and the flowers are expensive in the season of the year when they are rare; but even at the highest they are of small commercial value when compared with orchids.

There are among modern roses such magnificent developments from the crossing of different varieties that it is difficult to select specimens. The ancestors of our present varieties are mainly the China, the Damask, the Bengal and the Persian rose, combined with the wild roses of England and France. Sometimes the parentage is clear, and at others it is impenetrably obscure. But the blood of all the roses of history is running in the veins of our modern beauties, and we need not look too curiously into its source.

Our Country Villages—Their Make-up and Outlook.

[Extracts from a paper read by Mr. George B. Lamm, at Georgetown, Mo., Dec. 4, 1892, on invitation from the Library Association and Epworth League.]

Ladies and Gentlemen—There are in the State of Missouri about 1100 country villages. Of these, perhaps two-fifths have railroads, which bring more or less activity and growth to them, while the other three-fifths remain quite the same year after year.

You know that whatever of character and culture the farming commuities possess is given to them largely by these little towns. Without any further description of them, you can readily understand the influence of these towns, and can see their relation to the outside world. Anything that can be done for their benefit is that much done toward bettering the condition of the whole people. They are the little centers from which should radiate the intelligence, the enterprise and the growth of our people. Help them and you help everybody; harm them and everybody is injured. Is it a matter then of no little consequence that they should look up?

If we take a map of Missouri and notice the little dots and their names, and remember that they stand for the living, moving mass of our people, over two and a half million in number, our subject grows very large indeed. Its influence may be legion for weal or for woe.

Our two common and well-known methods of gaining information can be successfully applied to the investigation of our subject, viz: First, that of observation; second, that of study.

Whatever method we may pursue, if we would advance we must be familiar with our conditions and surroundings, and then draw conclusions of what our future possibilities may be.

Let us proceed, first, to notice the method of gaining knowledge

BY OBSERVATION.

It happens frequently as we jog along on our weary way through life that we *accidentally* meet with objects of interest, hear a stirring song, or read a pen picture that gives us new ideas, or makes more practical those which we already have.

To illustrate, the art of gaining ideas by observation I point you to people from our states who take trips across the American desert, or into the Rocky mountains, or even to the Pacific coast. Here they come in contact, without much exertion on their part, with a world they had never met with before, and have had opened up to them in the space of a few days scenery and characters both strange and real. This affords them new pleasure and new impulses and new ideas gleaned in new fields of observation, and thus serves the purpose of aiding them to separate the fanciful and imaginary in their own minds from things as they really are.

The traveler has opportunity to observe the rude customs of the uneducated and uncultured man in the person of the western Indian. Then he can grasp better the idea of the onward march of the ages that lie between them and the cultured and intelligent races that have improved their opportunities.

STUDY AND THOUGHT.

As a rule men gather the major portion of their best ideas by continued and persistent research in the world of books, gleaning from the motives and acts and thoughts of other men, and then, by the art of experience and practice, set them beautifully in the characters they bear.

This was the method employed by our forefathers. They looked at their own condition and then out to what it might be in the future. They were convinced of existing wrongs, of relics of cruel and hateful monarchies hanging over them, and as men of strong convictions, they said these things must not be. They saw that they were getting into a position to allow history to repeat itself, and they refused to go further along a backward track. What grand declarations of principles they gave us which stand like sacred monuments of marble through the changing scenes of a century.

They were gotten by study and reason and comparison. I like this method best, because, to think, is akin to inspiration. To stop, to think, to compare our conditions with that of others, and be convinced that we must help ourselves and lay the foundation for our own grandeur in the coming ages, this means progress.

Your community is very much similar to one in which I was raised and in which I have since lived for years, and I am familiar with your advantages and disadvantages.

I am in sympathy with every movement that tends to elevate and give tone and character and influence to society in our little country towns, for I well know that they are wanting in many things that will endear our surroundings to us, awaken our ambitions and satisfy the growing demand that progressiveness in the arts and sciences is making upon us.

I come now to consider the factors that enter into the make-up of our country villages and will try to suggest how they can be led into mutual helpfulness one to the other by paying more attention, through careful thought, to plans and methods in order to reach greater results.

FACTOR, THE FIRST.

One factor, which enters largely into the make-up of the society of our villages all over this vast country of ours, is the retired farmer. Their number in different villages over the country is in ratio to the fertility of the soil and market advantages. They are men who need rest from care and business; men who have fought hard battles of the formation period, endured privation, disdained luxury, cut off from educational advantages, worthy, honest, true men who have built themselves comfortable cottages in the village and turned over the farm to John, or Mary, or to the stranger to till.

Our own state and other states are full of objects which teach to the eye of the observer the times as they are, and the possible demands that shall be made upon us in the future. To see the progress of the outer world is to have new ideas and new thoughts and a better understanding of the present motives and ambitions that will urge our children to seek position and wealth and influence.

The fathers and mothers who are acquainted with the outside world, and who know whereof they speak, have greater influence with their children and are in less danger of misguiding them and being disappointed. Thousands of our retired farmers, abundantly able, see so little of this grand country.

It may be a question of importance to ask our multiplied societies of reform, "What can you do toward helping the retired farmers to take their outings with profit to all concerned, and with such expense as is suited to their means?" Would it be out of the way to suggest, in our State, the St. Louis and Kansas City Expositions and the State Horticultural, Dairy and Poultry Associations as places where acquaintance with the most progressive minds can be made and the best ideas of our growth acquired? The Columbian Exposition will be one of great importance.

If they will attend these places, on returning home they will lend more cheerfully their encouragement and approval, and perhaps give of their substance toward enterprises essential to the needed growth and development of the resources which a people may possess.

Because they have seen what others do and how they do it, what others think and why, then they are willing to allow matters at home to be conducted in a more progressive, modern and intelligent way. This is necessary to the growth of society in any town.

FACTOR THE SECOND.

I will now speak of the children. To speak of them is to touch a subject of profound interest to every true American father and mother. To speak of them is to speak of the pride of the nation and the hope of the future. To them will be handed down the glory or the shame of our republic. If from among the children of the farmers and mechanics and laboring classes of our villages there will not be raised up such as will be in sympathy, and will know how to plead the cause of the poor, speak honorably of labor, and give dignity to that class of mankind that numbers four-fifths of all the people on the globe, what will be the condition of future generations? Therefore, I bespeak for them, especially in the country villages, high schools and academies and far better educational advantages. Our school-rooms are too barren of libraries, and organs, and singing books. Our teachers educated to the use of these things do not know how to get along successfully without them. I have not been in a Sunday-school room for 10 years that did not have an organ. Why not have them in our day schools?

But our neighborhood has founded a library, and our children are delighted with it. This is necessary, for they must go where we have never been; they must do what we have never done; they must have the thoughts and experience of the world to guide them.

There will be a complexity of national affairs; there will be disturbing social elements; there will be powerful religious disturbances, of which we have never dreamed. We would not, I know, have our children led unarmed into these contests for liberty, truth and right. Especially can libraries be introduced successfully into our village schools under the guidance of our teachers. I congratulate you here in this respect. Never grow weary; never give up. Some sow, others reap.

Ambitious people find a way or make one out of these desponding places. God pity the village or the neighborhood where there is no true soul to advocate the cause of the children or open up for them a better way. Our best advantages are poor enough. Let them have everything along the line of education that it is possible for us to give. When we do the best we know how, we will be rewarded by young men and women coming to the front who will battle for American institutions with all their grandeur and worth.

FACTOR THE THIRD.

I shall now ask for opportunities for growth of thought among the business men—the men occupied in merchandise, the trades and professions, and also the young farmers. They are the strength and vital force of the country village. Upon their shoulders rests the success of every enterprise of any consequence. Every force for the advancement of the town should be ready to serve their wishes. If their plans fail, alas for the result. They are usually orderly and courageous, and have positive but conservative beliefs.

It appears to me that the most fruitful sources of intellectual strength and pleasure to them are the best political, scientific, religious and literary journals and magazines of our country and Europe. The town that will support a reading-room where our best journals can be read or gotten to read, is opening up the way to the best thought for them. To ask this is to ask little enough, and no one of them may be able to have these advantages without the aid of all. The business men and farmers have not time or disposition to study books; but a stream of intellectual light is being flashed weekly and monthly all over this country by these magazines and journals, and it is just suited to the wants of our business men and farmers. Reading-rooms of this nature are very scarce, however, but wherever they are they meet a want, and supply a demand to know concerning the discussions of the living, vital questions of the day, and business men want to know of these things. This knowledge from experts enables them to plan for the good of all, and this is a sacred duty which they have to perform.

FACTOR THE LAST.

While there are many minor factors whose interests are largely identical, and which are not susceptible of classification, such as the disappointed, the unsuccessful, the disabled and the aged, who can be guided into greater intellectual activity by each or all of the previously mentioned agents, yet I will trust this department of work to the tender and untiring efforts of the noble women of our country towns. Woman's work is of such influence and so closely woven into every fabric of our social, moral and intellectual advancement, that she can not be considered otherwise than a factor of unsurpassed importance.

Those little helpful societies that go into the every-day homes and hearts of mankind as the agents of sunshine and hope and love, these are to be fostered by her. Without the aid of these institutions, guided by the loving hand of our wives and daughters, many of the good results attributed to man's energies would be a failure.

The writing schools, the singing classes, the literary societies, the reading circles, the church institutions, the kindergartens, the cooking schools, and many others of different names, are the quiet influences which are blessed by her presence and help.

Woman's influence in these home attractions and enjoyments is the greatest cause of success. Nothing but reasonable excuse should be given by any woman for not taking part in all those educational and refining forces. These are fields wherein she can cultivate her power, and in turn lend all her culture and cheer. The moment she ceases to do so society feels the shock, and the longer she continues to neglect them the more degraded society becomes, until at last, it is hopelessly involved in corruption and sin.

Considering the forces which have worked against woman occupying her true sphere, and freeing herself from the chains with which the dark ages have bound her, I claim that no heroic efforts have ever surpassed hers. Unwritten though they may be, yet the world today is being charmed by her ideas of the right and of the true.

I plead for a renewal of her efforts to vitalize and crystalize the society of our country villages. Weave in every fabric of our age the charm and purity and loveliness of noble womanhood.

Hold up the hands of our business men in honorable enterprise of whatever nature, and add your courage and culture as forces to mould the lives of men.

Your reward will be more sure than the harvest after seed-time.

THE OUTLOOK.

There can be nothing cheery about the outlook of our country villages unless everybody gets awake and keeps awake. To do this you must use every possible means within your power to work intelligently and systematically; keep all classes and factors interested in their sphere; let no one be idle and then no one will retrograde; stamp the word progress on every enterprise; do not complain about society, but begin to do something for the community in which you live, and the product of your labors will be a living monument to your success.

Our villages are here to stay, let us make the best of them. Their society can be purer than that of the city, and the atmosphere more wholesome to the breath. The boys are not thrown into corrupt crowds, and the expenses of foolish fashion avoided.

Progressive villages make grand nurseries for childhood, good homes for those who are weary and need rest, cheap places of abode for the poor, and their good influences may be made to reach into the country for miles away. This is what is meant by Christian civilization, and to accomplish it we must have faith in righteousness, liberty and home.

Bees and Fruit-growing.

At the January meeting of the Jasper County Horticultural Society at the city hall in Carthage, the following paper on the "Influence of the Bee on Fruit-growing" was read by W. W. Sewall, and at the request of the Society we produce it in these columns as a matter of interest to all the bee-keepers and fruit-growers:

The term bee is a common name applied to a very large family of honey-loving or honey-bearing insects, amounting in all parts of the world to many species. Like many other useful members of the insect creation, wonderful habits of life and mysterious methods of reproduction, as well as the wide influence they exert, and important bearing they sustain to reproduction in the vegetable kingdom, it is at best but poorly understood by the masses, and is frequently, by the thoughtless, maligned and blamed as an enemy of the fruit-grower.

It is neither the object of this paper to enumerate nor describe the numerous different species of solitary and social bees, nor my present intention to set forth the wonderful endowments of the common hive-bee by describing its power of flight, its wonderful ability to find its way home by instinct from long distances, its superior gifts of sight, hearing, feeling, etc. Nor yet to describe its apparent perfect knowledge of mathematical economy, both in form, and in quantity of material, as displayed in the construction of its combs. Nor to enlarge upon its loyalty and bravery, shown in the defense of its home and stores. Nor yet the wonderful mysterious, facts that have been discovered in their methods of reproduction, which surpass many other insects. These things and many other peculiarities, interesting as they might be made to the student of nature, it is not my present object to discuss; but to inquire more particularly as to its relations to the science of horticulture, both as a factor in fecundation and also in the destruction of tender fruits.

One of the most interesting subjects of philosophical inquiry is that of insect pollenation of plants. Naturalists have long been aware of the fact that pistillate flowers, whether growing on the same plant with the staminate, or on different plants, owe their pollenation mostly to the agency of bees, which carry the pollen from the staminate to the pistillate flowers. Nearly all such plants have flowers which secrete a nectar attractive to bees, and this has been regarded as one of the numerous evidences of the agency of a designing Providence; but still stronger evidence, if possible, is furnished by the fertilization of many perfect flowers by the agency of bees. It has generally been thought that flowers bearing stamens and pistils were always self-fertilizing, but this is not the case with many kinds. There is a provision by which many plants are prevented from in-and-in breeding, the parts of the flowers being so arranged that it is impossible for the pollen to come in contact with the stigma without the agency of bees or other insects in search of honey. This is a case in which there is conclusive evidence that provision has been made not only with the evident design of preventing self-fertilization, but also with the design of attracting the bees, which are made the agent of sure fecundation, instead of leaving it to the agency of the hap-hazard winds, which, at best, could only be depended on, if at all, when the stamens and pistils were favorably located.

Again, for the purpose of more perfectly insuring cross-fertilization in many other perfect flowers, the stamens precede the female organs in development, and shed their pollen before impregnation can take place, leaving the pollenation to be accomplished by the agency of bees, which bring the pollen from other flowers not so forward in development. But, besides all this, it is a well-known fact that when bees are gathering honey and pollen (for they gather both at the same time), they almost invariably work consecutively upon a single variety of flowers—a wonderful provision of the Creator—for by so doing they are sure to carry the pollen just where it is wanted, without mixing any other kind. This is evidence that they were designed by the Creator for this especial work of fertilizing the flowers.

Another fact about as wonderful is that the plants, precisely at the time when they are in need of pollen, should hold out to the bees their myriads of beautifully colored fairy cups, each containing a tempting morsel of richly perfumed nectar. This looks like a shrewdly arranged advertisement on the part of the plants to swap honey to the bees for pollen—written in three different languages, those best understood by the bees, viz. beauty, fragrance and sweetness, appealing with success to their keen sense of sight, smell and taste.

It is also a well-known fact that all our clovers (which are our best honey-yielding plants the world over) are almost completely dependent on bees for their pollenation, and that the common red clover, although it blooms at a time when the domestic hive bee is very abundant, cannot be fertilized by it because the nectar cups of the clover are too deep to be reached by its short proboscis, and therefore it has to depend on the bumble-bee for pollenation; but as these bees do not winter over (except the queens), and therefore do not become numerous until late in the season, therefore the first crop of red clover is very imperfectly pollenated and is seldom used for seed, but by the time the second crop is in bloom bumble-bees are very numerous, hence the second crop is well fertilized and is always preferred for seed.

It is also a noteworthy fact, illustrating the importance of bees to fruit-growing, that very early in the spring when most fruit flowers open, the hive bee is comparatively very numerous, as most of the workers of the previous autumn are wintered over, and thousands more are hatched out from 30 to 60 days in advance of the earliest flowers, while many other kinds of bees and honey-loving insects are extremely scarce, as they have to be reared in the spring from eggs that have been either wintered over or deposited in the spring.

For these reasons, and many others too numerous to allude to in this paper, it is not hard to understand and appreciate the importance of so potent a factor as the bee in the economy of plant reproduction. Other things being as they are, if it were not for the intervention of the bee, very many of our fruit-bearing plants, vines, shrubs and trees would be rendered worthless, or at best unprofitable, if, indeed, they did not become altogether extinct, and horticulture would be shorn of half its glory.

But, says the objector, so far you have only spoken of the virtues of your bees; how about their destroying our tender peaches, grapes, etc.? I answer, from my own experience and observation and the writings of our closest students of nature, our domestic hive bee does not injure perfectly sound and whole fruit of any kind, no matter how ripe, tender or luscious. But stop, says the objector, I have myself seen them by the thousand on my tender grapes and peaches in dry, hot weather. Admit it, I have seen the same; but when you examine closely you will find that they are working exclusively on fruit that has either cracked open, been bitten or is decaying. It is almost an impossibility for the common hive bee to break the skin of fruit; they are not built for that purpose; their mandibles are made for working warm wax in comb-building, and are comparatively as smooth and round at the ends as the human fingers without nails, and as incapable of tearing. As an evidence of this, they are not capable of splitting or tearing open the nectar cups of red clover or any flower too deep for them to reach the nectar. When honey is scarce, bees will collect any saccharine matter that comes within their reach, such as maple and sorghum sap, or the juice of ripe fruit, if the skin is broken, but they never meddle with whole or unbroken fruit; but when nectar is plenty in the flowers, they seldom take notice of anything but honey.

When a citizen of Illinois, the writer had an apiary of over a hundred stands of bees, and during a hot dry summer when the flowers were yielding no honey, a neighbor, who had a few dozen grape-vines in bearing, complained that my bees were destroying all his grapes, and when told that bees did not injure sound fruit he was incredulous, and said he would prefer to believe his own eyes, and invited me over to see for myself. On our arrival we found his grape-vines swarming with bees, but in all cases they were sucking about wounded grapes, cut by birds, etc., cracked open or rotting; but argument was of no avail, he would have it that my bees were aggressors. So I told him I would put my bees to a very severe test, by placing a few bunches of his ripest and sweetest but sound grapes at the entrance of my most populous colonies, which we accordingly did; and although they remained there about a week, not a grape was injured in any way, although the bloom was all worn off by the bees climbing over them, and the grapes considerably withered by the heat of the sun.

Bees are like all other living things: when pressed with hunger they will eat anything accessible that will satisfy their wants, whether it is legitimate food or not.

They were never intended for scavengers, like flies, nor to sip their food from sweets in bulk, as in such cases they always plunge in and are drowned.

I want it understood that I am not defending all kinds of bees against these charges, but the domestic hive bee only; for nearly if not all the many kinds of solitary bees are provided with powerful cutting mandibles, with which they excavate cavities for their nests in various substances, and also cut up the material of which they construct their nests and cells.

The same is true of all the numerous wasp and hornet families. Hence nearly all these varieties of insects are capable of cutting the skin of fruit, and actually do perform, with birds, terrapins, etc., most of the initiative work of destruction for which domestic bees get the credit, because they are found in bad company, utilizing the wasting juices.

I think it quite probable that when honey is scarce, even our hive-bees do sometimes destroy fruit that is only partially injured by being slightly cracked, or cut by birds, wasps, etc., that might otherwise be merchantable; but these cases are rather rare, and the damage is but small when it does occur.

Yet I admit they are considerably in the way of gathering fruit at such times, and very annoying to pickers, and cause some inconvenience.

Suppose we reverse the telescope and view this subject the other way: what about the souring juices of fruit being injurious to bees? Has anyone a better right to establish a vineyard or set up a cider-mill in the vicinity of an apiary, and thus breed disorder among the bees, than the bee-keeper would have to establish his apiary in the midst of fruit-growers, even if bees do occasion some loss and inconvenience? Is it not possible that there is ground for complaint on both sides? When the mutual benefits are considered, would it not be well for both parties to learn to bear and forbear in a neighborly spirit?

The bee was made for man's assistant and co-laborer, especially so if he is engaged in fruit-growing, as in the garden of Eden, and to be an example of industry, honesty, loyalty and bravery. The bee seldom violates the God-given instincts unless its appetite is either tempted or perverted by the neglect or bad management of man, its intended master, keeper and friend.

The Exposition.

The grandest show the earth ever saw is at last blest with fine weather, increasing crowds and the prospect of a happy issue out of its troubles. All that now remains to be done is for the managers to get down to somewhere within 45° of the people, adapt themselves to their conditions and circumstances, assign the big-head, as the bank managers do, to others; only do it before the crash comes, that failure and bankruptcy may be averted. It is quite true that everything in this country partakes of the largeness of its area and the freedom of its atmosphere, but this only makes asinine bossism on the part of those who are for the moment clothed with temporary largeness and brief authority all the more odious.

Forty years of experiment have taught those addicted to shows of this sort many things unthought of and unknown when the first of its kind was conceived by royalty and brought forth in Hyde Park, London, where the entire space covered was less than 20 acres, and all the world flocked to it. Here we have hundreds of acres, and the entire Exposition partaking of the same magnitude except the great crowds from all over the earth in attendance, and yet the experience of those years and the various similar exhibits which have been held on the continent of Europe, of Australasia and America have not been without their effect on the minds of the people of the world. Though they have not brought universal peace, international brotherhood and the millennium, they have brought the world, in a measure, in contact, have distributed sentiments of human equality and equal rights, measured the quality of governments and determined their stability by their goodness, and shown that worth was not measured by rank or name or historic pedigree.

But it is in the greatness of the innumerable branches of human industry that one naturally expects the great Exposition to excel all its predecessors, and the visitor will in nowise be disappointed as as he passes over the grounds and through the departmental and other buildings, for it meets him at every turn and at nearly every step. Here the people of every state, and measurably so of every country, have gathered their best, and exhibit it in quantity as well as in quality to tell the story better than in language or pictures, in poetry or prose, and in such fashion that he who runs may read, be his mother tongue what it may or his nativity what it will.

Should the visitor seek information as to where on this vast continent he can find the best climate and soil for the finest fruits, he will naturally visit the Horticultural building. He will find it large—the main building 998×250 feet, with 8 green-houses 100×24 feet, built of iron, covered with glass, of beautiful architectural design, the interior having "magnificent distances," and the whole noble, lofty, light and airy, an elegant palace for the finest and best of nature's most beautiful and most luscious of products. He will ramble through these lengthy aisles first cursorily, noting only what is on exhibition. By that time he will wish to examine critically, to see thoroughly, and compare judiciously. He will have noted the signs arching the several exhibits and seen many well-known names—names of states thousands of miles apart, as varied in their climate as in their topography; the products of the antipodes, of Europe, of South America and of many of the islands of the ocean. He finally reaches that wing of the great structure limited to fruits, to find Florida exhibiting the pine-apple, cocoanut, orange, lemon and other citrus fruits; and California showing the same, with the addition of dried, canned and otherwise preserved prunes, oranges, grapes, in almost unlimited quantities. He will find also magnificent fruits from other Pacific states, and then, wending his way, will find them from Oregon, Idaho, Arizona, Montana, Kansas, Missouri, Iowa, and all the way east to the New York and New England Coast.

Which has the finest show of fruits? the reader asks; and modesty prompts the answer, let the committee of final awards determine. But then he wishes to have our judgment and the reasons therefor, and we give it cheerfully, and as honestly as heartily. If he stop under the telling sign, Missouri, and make a thorough and exhaustive examination, he will find there a very large and very fine display of apples, pears, plums, peaches, cherries, all kinds of berries, cabbage, squash, sweet potatoes, rutabagas, turnips, parsnips, carrots, cantaloupes, egg-plant, sweet corn and other products of this glorious State, this magnificent soil and incomparable climate; he will find the exhibit the largest in the building, the fruit of the finest and most luscious, adapted to use the year round, and to transportation to all the markets of the world. These are all preserved in glass jars, in fluid, and though the natural color is not wholly preserved the form and size are, and the color too, in a measure. They convey to the beholder a clear and comprehensive idea of the fruit and vegetable products of the State, and afford the visitor an opportunity of comparing them in size and apparent quality with the exhibits from other states and territories; and we can assure the reader that the comparison will, in the estimation of all honest and impartial critics, be in favor of Missouri.

Major J. C. Evans, President of the Missouri State Horticultural Society, who with Mr. Goodman, the energetic Secretary of the same, and other able and progressive citizens, prepared the fruits, etc., for exhibition, is in charge. He assured us that he had sufficient fruit preserved to sustain the show until the new fruits are ready, and enough apples in cold storage to keep 500 plates supplied daily with fresh supplies as needed.

This display of fruit meets our expectations. It is a fair representation of what can be done in the way of commercial orchardlng in the State. It explains how and why it is, that in successful years these products alone yield the growers twenty millions of dollars, why the State is so rapidly being settled by the experienced fruit-growers of the North and East, and finally, why Missouri is to become by its unexcelled soil and mild climate the great orchard of America.

There is room in this thought to dwell, were our space unlimited, for very few even of our best read citizens have any comprehensive or adequate idea of the magnitude of its possibilities. There is reason for the possession of the largest peach orchard in the world; reason for the largest fruit farm in this or any other country, and, too, why commercial orcharding is so rapidly becoming one of the leading industries of the State. For fresh fruits for daily use for shipment to the large centers of distribution, and others for trans-shipment abroad, no State has exhibited finer qualities of fruit, or a higher appreciation of the crop, as one worthy of the keenest skill and best judgment to insure success and ample returns. When a man can in successful years secure a higher price for his product than his land would bring in the market, he comes pretty near being in a profitable business. Measurably this is in soil, climate and shipping facilities, but that other all important factor, the men for the work, must have equal consideration. To the men at the head of the State Horticultural Society, the State and the world owe a debt which time and history only can pay; and when our agriculture, stock-raising and dairy industries shall have the same skilled and experienced management in the hands of similar men of good judgment, then will all the rural industries of the State compare with it, and Missouri claim and maintain the proudest place in American industrial progress and enterprise.—Colman's Rural World.

Gardening as a Profession.

BY SAMUEL MILLER.

While at Columbia, a lady wished to introduce her nephew to me, saying that he had gone through a regular collegiate education, studied law, commenced practice, became disgusted with it, and I don't wonder, and was now going into horticulture. This, to me, was a marvel, and when I was introduced to him, said that if I could in any way assist him he could draw upon me freely.

The time is coming when this branch of industry will be much more extensively followed than now. Our people are fast becoming a vegetable and fruit-eating people, and less dependent on animal food.

A visit to Henry Schnell, at Glasgow, shows what can be done in this line, and a description of his place may interest many readers and induce others, near to little inland towns, to engage in the business.

Six years ago he bought 40 or 50 acres of land two miles east of Glasgow, and at once commenced operations, having previously carried on "trucking" a little nearer town, and thus had some experience and a fair start. He has on his new place the following: 600 apple trees of the leading varieties, five years planted; 250 pear trees, same age; 200 peach trees, from one to five years planted; 50 cherry trees, five years planted; 100 apricots, same age, some Russians among them; and in strawberries four acres, raspberries three, blackberries one, currants, gooseberries and grapes half acre, asparagus one acre, a good-sized green-house, and 4000 feet of sash for hot-beds and cold frames.

This season he bedded 70 bushels of sweet potatoes, and when I was there they were pretty closely pulled, and with lots of orders on hand to be filled yet.

His strawberry crop was perhaps more than half picked, and yet, if they got a good rain soon, there might be 60 to 100 bushels of fruit to pick.

He employs about a dozen hands regularly and pays them good wages, so that all moves along smoothly. I would lay a wager (were I a betting man) that in all his cultivated grounds, acres of cabbage, young asparagus beds, onions, beans, etc., there could not a barrow full of weeds be found.

He has two teams on the go most of the time, and sends his fruit, as well as vegetables, all over the country. His name is enough to guarantee anything he sends out to be true to name. I got strawberry plants from a dozen different parties the past spring, but none equal to those I got from him. He sent me fifteen plants of pansies in the season, and just now they are as fine a lot as I ever saw. They far surpassed anything on his place when I was there. This shows what a man can do and what opportunities there are for horticulturists here and there.

Of course it would not need many such to supply the wants of the community, but there is a chance for any man to make a good living and a little money near any town of a few thousand inhabitants. Any town, where the people are up to the times, will use $50 worth of strawberries for every 1000 inhabitants, and some towns double that quantity.

The reader will pardon me for exulting in this man's success, when I tell them that when he was but a boy he got his first lessons and inclinations to horticulture from me. He told me whilst there, that one stroll through my grounds was when the first impression struck him, and but for that he would likely now be a merchant, as he was then a store-boy.

One thing is certain: as a rule, the horticulturist lives a little better than the average of men, as they always have plenty of fruit and vegetables to eat. He uses 400 to 500 loads of manure annually, and his grounds show it. His soil is an excellent one naturally.

Orchard Cultivation.

This might be appropriately called tree cultivation. On this subject men differ widely, as their published ideas indicate, but the proper or best methods of cultivating trees and plants is a science. Nature marks the best ways of tree culture by their roots, limbs, fruit, and all the circumstances attending the growth and fruit bearing of trees. The roots are the first consideration to tree life, because they draw up and supply sap life for the top growth of buds, leaves, limbs, blossoms and fruit. Then a supply of a large amount of roots is absolutely necessary to produce a good, healthy and full-bearing tree, with its limbs, buds, blossoms and ripened fruit.

It is an absurdity to suppose that a tree can produce a full crop of sound fruit after its horizontal roots have been cut away by deep plowing or spading, or when large limbs have been cut away from the sides of the trunk by a sudden pruning; because, when those roots are cut off, a sufficiency of sap cannot rise into the top, and when large limbs are cut the tree is shocked, and its nature changed, and generally a decay in the center of the roots and body follows such harsh and unnatural methods of cultivation and pruning.

Any person of common observation can soon satisfy himself of the natural correctness of these undeniable facts. Hundreds of orchards have been retarded and ruined by such plowing and pruning. The time to plow or dig deeply for the orchard is before planting, and at a distance from the ends of the running horizontal roots, and nature lightens and moistens the soil by freezing and rains sufficiently to the rapid growth and well-being of the trees, and light top hoeings or scalp plowings, merely to kill weeds, are sufficient from the hands of man. The long, broad and branching horizontal roots are nearest to the top of the earth, and are moistened by rains, and they draw the food substance into the body of the tree, while the tap and radical roots penetrate deeply into the earth, in order to hold the tree upright above ground, mainly. It is the sap that is drawn into the tree by the horizontal roots, mainly, that supply the annual growth, buds, blossoms, flowers, leaves, fruit, wood and bark. Whenever these roots are cut the tree declines, and when large limbs are cut, the tree sends out a multitude of water sprouts.—HENRY HURD, in "Cincinnati Gazette."

Pick and Pack Honestly.

The amount of fruit that is sent to market by wagon, train or boat every season that is unfit for market is something enormous. Why is it that farmers or fruit-growers, who appear to have enough sense in many other matters, will persist in trying to sell to their customers, fruit that they know is not fit for sale, and packages that they know they have packed with the best berries on top, while the bottom of said package, whatever kind it may be, basket, bag or barrel, is filled with poor, miserable, small and wormy stuff, and entirely unfit for food? Farmers and fruit-growers, if you have been doing this, stop at once. To those who are free from the vice, we say, don't commence—you can't do it and make money. Pick and pack your fruit honestly and fairly, if you want to succeed in the end. If you get a good customer, don't try to cheat him by giving him an inferior article for a good one; if you do, he is lost to you.

If you send altogether to commission men, the buyers know your brand or package in a day or two, and if you are caught with false packages you will be the one too lose, for they will buy your fruit at about half price on account of the previous bad packing. Remember that the trade once dropped because of bad packing and poor fruit is hard to regain, if it ever can be. Send your good fruit sorted by itself, and if you send poor fruit, don't top out your package with good fruit; you will rue it if you do. If you don't do the packing yourself, watch the man who does. He will not be likely to pack right if not watched and instructed. The idea is just this: If you ever intend to succeed in fruit culture, you must strive to grow the best fruit possible, and pick at the proper time; pack and consign right good fruit, and you need have no fear of the consequence. The buyers are in the market among the sellers every day, and it only takes a few days to find out what kind of fruit the grower is sending, and the buyer is there to buy it on its merits.—"Green's Fruit-Grower."

Does Fruit-Growing Pay?

What a question! Yet it is sometimes asked seriously. It seems to be on a par with another droll inquiry, is life worth living? It all depends, don't you see. The life of a spendthrift or a scoundrel is not worth much; nor is the life of an ill-managed orchard, mismanaged by an ignorant jackanapes, very much better. Fruit-growing bears a great resemblance to most other avocations. Who was the painter who replied to the question of a tyro, "how he mixed his colors?" "With brains, sir." In our wanderings up and down the planet we are apt to come across all sorts of plantations, which are provocative of laughter, or tears, or—no, we won't.

But let us consider. First, in order to grow good fruit—which is the only kind that will pay—you must follow up the necessary conditions; you must keep the land in a high state of fertility, which can only be effected by regular manuring: that is, by top-dressing with the best fertilizers at least once a year. Of course we include in this the absence of weeds, or any kind of growth, upon the land which is cropped with fruit-bearing trees. If the trees do not pay, away with them: if they will, give them a fair chance.

Fruit is every year becoming more plentiful, and the increased consumption keeps pace with the supply. If this condition forbids just profits to the individual in fruit culture, it improves the chances for the many, and makes for the best interest of agriculture at large. It is better that many should acquire a competence than that one should make fortune, and it is one of the kindest influences of Providence, that the most wholesome and delicious of human food is within the reach of the most humble and impoverished of mankind.

As our population increases, the orchard, the garden and the dairy will more and more take the place of the grain-field. There is no fear that we shall want bread, and there is no fear that we shall have too much fruit.

The Le Conte Pear and the Blight.

Writing to the "Florists' Exchange," J. H. Hale says:

Ten or more years ago, when the Le Conte pear first came into popular favor and was extensively advertised through the South, the one claim above all others urged in its favor was that it was entirely blight-proof—the disease never having been seen on any trees of this variety, while other varieties, even in like situations, had suffered severely. For this reason many nurserymen used the Le Conte stocks, which can be readily grown from cuttings in the South for the propagation of other varieties upon them. Some four or five years ago in Southern Georgia and Northern Florida, the writer saw trees of this variety suffering seriously from the blight, and later it was seen to a limited degree in the orchards further north; and now comes a report from nearly all sections of the country where the Le Conte is growing or other varieties grafted upon it, that this destructive disease is doing greater damage to this variety than all others combined. A tremendous wave of pear-blight has within the past few weeks swept over nearly all the Le Conte orchards in the South; and so again it is demonstrated that no variety is entirely free from this destructive disease, and that until science comes to the rescue and teaches us what the disease is and how to control it, we must expect serious losses. It is also reported that the famous Idaho pear, which nurserymen are propagating so extensively, appears to be more subject to the blight than any variety yet tested in the East; whether it is entirely free from the disease in its original home I am not able to state at this time. One thing that may account for the spread of this disease among Idaho trees is that a very large number of them during the past two years have been propagated in the South upon Le Conte stocks; therefore it may be possible that the disease originates in the stock rather than in the scion. My own observation is, that the rapid-growing varieties are far more subject to the disease than those that make a slower growth and therefore likely to be of harder wood.

The Object of Roots.

In a recent address, Dr. Wm. Anderson states that "the popular belief is that plants are nourished through their roots, which for that reason are believed to be the all-important parts, while the leaves are mere ornaments, enjoying the upper air and sunshine and profiting by the work done underground. But a juster knowledge, one of the fruits of abstract investigation, tells us that the roots are mainly useful in holding the tree erect, and have comparatively little to do with providing the materials for building up its structure. It is the leaves which form the great laboratory in which the main components of the plant are extracted from the region where superficial observers would least expect to find them—namely, the atmosphere;" and there is enough truth in what the Dr. says to warrant observation and experiment; but when he has deprived the tree or other plant of roots and still holds it in place, as they would, he will yet discover that all the elements of the atmosphere will not sustain life.

A Simple Botanical Classification.

The primary idea of a garden is to display plants—trees, shrubs, or plants of more humble growth—in such manner that they will attain their greatest and best development, and if possible arrange them as a harmonious pleasing whole—a gem in the landscape. This can never be done without considerable definite knowledge of the individuals composing the vegetable kingdom.

Now, the science of botany has been devised to aid that knowledge, and all the botanists, above the rank of herbalists, have adopted some classification.

Without classification the human mind would be utterly unable to grasp the vast multitude of natural objects—whether plants or other bodies. The botanical schools vary greatly; there are those who attempt no classification whatever; there are those who attempt a little, and there are those who attempt vastly too much. The gardener, the florist and the great public reject them all. They are cumbered with too many terms; they vary too much; life is too short to fool with them, and the botanist knows it. Then what is to be done to give a comprehensive idea of the vast amount of material available in nurseries, but seldom called for? It is now selected, often in a hurry, often for its cheapness, always for its supposed adaptability; but the mind is always embarrassed by the multitude of material presented in a perfect maze of straight-rowed miscellany.

There is not a garden in the country—and but few in the world—where analogous plants can be compared without a great deal of physical waste and loss of time. Botanists, scientists as they undoubedly are, have chiefly confined themselves to arranging sheets of paper with portions of plants glued upon them. Herbarium sheets are convenient, but perfect flowering plants are object-lessons infinitely superior. If they could be arranged with as much convenience and sequence as the herbarium, would they not facilitate exact knowledge? Given a garden, it is easy, and as a matter of fact, some of the greatest nurseries unconsciously come near to classifying the larger series, such as conifers and bulbs and grasses.

Let us suppose a nursery:

(a) Are mostly all plants with two seed-lobes, and they build up their annual wood outside. They can easily be determined.

(b) Are all or nearly all plants with a single seed-lobe, and their stems are vessels vertically arranged.

(c) Are plants without true seeds or seed-lobes; they are ferns and their allies and equisetums.

All the trees and shrubs and most of the herbaceous plants belong to section *(a)*. Botanists divide it into four parts:

(a) 1. Are plants with many petals—magnolia, geranium and roses.

2. Are plants with their petals joined into one, forming a cup or tube—honey-suckle, heather, gentian.

3. Are plants without conspicuous petaloid organs—altenanthera, polygonium, willow, oak.

4. Are trees or shrubs with what botanists term naked seeds, but what gardeners know as conifers—larch, bald-cypress, ginko or salisburia, etc.

These four sections exactly represent the modern botanical division of these important plants, and no nurseryman need be told how it would help him to grow them together, for the purposes of reference exhibition to customers of some knowledge, or for his own cataloguing and handling. Those who know how, can easily arrange a moderate sized nursery into four or five divisions, and they will as surely know their plants better than their neighbors, as light will follow darkness.

(b) Contains the plants we speak of as bulbous, and the palms, yuccas, grasses, etc. They also are divided into series, of which irises, lilies and grasses are representative.

(c) Then there are a few hardy ferns.

This is all that a nurseryman or florist need do to make his collection "gee" with modern botanical science, and earn the character of "public benefactor" when a scientist visits him on a very warm day.

It is even easier than this to arrange all the trees and shrubs ornamentally, for me at all events, for there is no tying down to the straight-row in the ornamental garden; and my earliest recollection always travels back to a certain terrace window, a mass of Gentiana acaulis, and a run over the green slope between. There were shrubs and trees behind that bed of gentians—rhododendrons, arbutus, lilacs, with primroses and phlox between, and ash trees beyond—a group which I was taught early to observe, all had tubular flowers.

JAMES MACPHERSON,
In American Florist.

Teach Horticulture at School.

[The following, by Jacob Faith, was read at the late State meeting of the Missouri horticulturists :]

I can't think of any subject or paper that is more needed for this meeting than that of urging that horticulture be taught in our country public schools—a law to set aside one or more days out of each month for horticultural teaching to awaken the inherited love for fruit in the rising generations. In a State as well adapted to the growth of trees and vines as Missouri, it is the duty of our Society to take steps for the advancement of this branch of education. Our educational system will not be complete until horticulture is taught in our schools. Why do we fall short of the old world in horticultural knowledge? Because that is a branch taught in their schools and sadly neglected in America. Why is it that we are so far in advance of the old country in machinery to do our work with the utmost possible speed and ease, and fall so short in horticultural skill? I refer only to those who have no opportunity to study horticulture. Missouri has experienced horticulturists who are able to write a hand-book or a guide to fruit culture, how to propagate, plant, cultivate, etc., to be studied at school. For an award of $50 for the best book, there would doubtless be several competitors. A committee could be appointed to make the selection of one, or a part of all, and pay accordingly. This book could be enlarged each year as deemed necessary. Educated tree and vine planting adds more wealth and invites more visitors than any other enterprise of our land. Every lover of tree, vine and flower should agitate horticulture as a branch of study in our country schools. As the stars and stripes teach love and loyalty to every true American, horticultural teaching at school would yield influence of great value; it would increase the interest in tree planting, and be a source of untold profit and pleasure to thousands of our land. No better monuments to our memory than trees, vines and flowers can be erected.

Legend of the Morning-Glory.

'Tis a very wondrous story
Of how the morning-glory
  Grew to be a vine,
So exclusively adorning
The beauty of the morning,
  Heavenward to climb.

When the earth from sleep was waking,
And every cloudlet breaking
  Into crimson dawn,
When brilliant colors fleeting,
Dissolved in warmest greeting
  To flowers just born:

Suddenly a young plant tender
Felt the radiant splendor
  Of the sun's keen dart;
And the bright, gay thing, delighted,
Found purest love ignited
  Deep within her heart.

Ever up, and upward ever,
Tired of climbing never,
  Rushed the frenzied flower,
Into buds and blossoms breaking,
Herself so lovely making,
  Till the noonday hour.

Then, alas! poor morning-glory,
So goes the mournful story
  That the birds declare,
Seeing that her ardent lover
Was still away above her,
  Languished in despair.

Each corolla closed in sadness,
Away went all the gladness
  Of its charming hue;
But the love was never dying,
And the flower ever hieing,
  Revived by morning dew.

Down upon the flower-maiden,
With mighty fervor laden,
  Came the royal kiss;
While the timid, gentle being,
So great a suitor seeing,
  Trembled in her bliss.

Fiercely wooed the sun, excited
At seeing love requited
  In the novice breast;
But he robbed the modest flower
Ever after from that hour
  Of her spirit's rest.

All aglow with passion burning,
The quickened life was yearning
  For the far-off one,
And the leaflets, bolder-hearted,
Each helpful tendril started
  Up to reach the sun.

Gayly climbs, herself deceiving,
In innocence believing,
  Love spans all distance great,
Till in vain, despairing, weary,
The blossom once so cheery,
  Yielding unto fate,

Fades at midday in her sorrow,
But waiting for the morrow
  Once again to try,
Once again to use the power
Of each purple and pink flower,
  To win the sun on high.

LAURA C. REED.

Crossing and Hybridizing.

Let me now invite your attention to the purposes of cross-fertilization as is admirably stated by Darwin, Fuller and others. The results sought in cross-fertilization of varieties, of the hybridization of species, are various; but the principal one is to produce something different frem either parent. Sometimes we may aim to increase the size, or change the color, texture, flavor or other characteristic of a fruit, or the size, form and color of a flower, or the habit of a plant. Adaptation of the various species and varieties of cultivated plants to specific conditions is another and often important subject sought in producing cross-bred plants. There are many species, and occasional varieties, which have been so closely inbred in their native habitats or elsewhere, that they have acquired a fixedness of character, which removals to other localities, and subjection to widely different conditions, fail to affect any material change in their offspring; but by crossing and the introduction of new blood or elements, the foundation of generations —as it may be termed—is broken up, and wider deviations from normal types soon follow. It may sometimes be necessary to introduce an undesirable element in order to force a plant to break away from its typical form, but when we have succeeded in this it is not generally difficult to get rid of the undesirable characteristics by careful selection. Then, again, we cannot know in advance what will be the result of crossing any two plants of the same genus or species, for even the mingling of two inferior elements may result in the production of one superior to either of the originals. Still we would not advise using inferior materials in preference to superior, except when it is absolutely necessary to effect a desired variation, as may sometimes occur when a person has but a limited number of a species or variety with which to experiment. A wilding may possess some very desirable properties, such as vigor, hardiness and exemption from disease, while its domesticated representative lacks one or all of the properties; so by combining the best elements of the two, a new and superior progeny may be produced.

We may among fruits secure size, color and texture, in fact all the good qualities known to belong to or exist in a certain species, and still these will be of little value unless the plant itself is adapted to the soil and climate where it is cultivated. One variety of the plant may be more hardy and safely endure many degrees lower temperature than another of the same species, but no amount of nursing or moving about will ever change a tender plant into a hardy one. But by introducing new elements, as in cross-fertilization, we may multiply the causes for wide variation through the different hereditary characteristics of both parents. Why the seeds of plants should produce both tender and hardy varieties can only be accounted for upon the hypothesis that each possesses hereditary transmitted characteristics; but what the nature of the laws are that control this transmission we know little or nothing. We can form no conception why the advantage from a cross is directed exclusively to the vegetable system, and sometimes to the reproductive system, but commonly to both. It is equally inconceivable why some individuals of the same species should be sterile, while others are fully fertile with their own pollen: why a change of climate should either lessen or increase the sterility of self-fertile species, and why the individuals of some species should be even more fertile with pollen from a distinct species than with their own pollen, as with many other facts so obscure that we stand in awe before the mystery of life.

JOHN CRAIG,

Horticulturist Dominion Experimental Farms, before Committee on Agriculture, House of Commons, in Farmers' Review.

Horticulture as Related to Home.

BY M. W. SERL, LEBANON.

The æsthetic sense, if inborn, can at first exist only as a germ, to remain dormant or to develop, as conditions may favor. In the infancy of the race, when our ancestors were the contemporaries of the cave bear and the mastodon, and dwellers in the caverns of the earth, a fierce struggle for existence, with only clubs and stones for weapons, precluded the idea of attention to anything not essential to defense or to a supply of daily necessities; but as time passed men came to more assured positions, and the sense of the beautiful was manifest in rude decorations of the person, by painting the body with such attractive colors as were at hand, by hanging bells about the neck or pluming the head with gaudy feathers.

Caves and huts gave place to more pretentious dwellings and to more ornate constructions for various purposes, while gold, silver and precious stones furnished ornaments of a higher type of personal adornment; but it was only when the race had entered the realm of a higher civilization that the verdant and floral beauties of nature found recognition.

Though our knowledge of primitive man is restricted to such evidences as the earth has preserved for our discovery; yet even now, in darker regions of the globe men are found in conditions so similar that we may infer that what is true of the one was true of the other. The denizens of Central Africa and the wild Indians of the plains manifest their appreciation of the beautiful, in barbaric efforts to adorn their persons and to decorate their dwellings, weapons and implements. The same tendency appears in the history of all races in their savage condition. This innate sense found higher expression in the sculpture, painting and architecture of Egypt, Greece and Rome; but horticulture, though not wholly ignored, received more tardy recognition.

In our own times, though a rose or some flower, cherished as a remembrance of other homes, may have bloomed near the pioneer cabin, yet some remove from the demands for unremitting toil has been necessary before things merely of beauty could find place as established necessities. To some the awakening never comes. This, I fear, is shown even in our midst. To find dwellings with no vestige of beauty within or without is not difficult. No flight of fancy or artist's picture can make the impression of these desolate homes more sad or clear. On the other hand, we have all felt suggestions of something purer and higher when passing a cabin where a carefully guarded flower is seen blooming in the window, where in the small yard, fenced away from pigs and chickens, a little plat of grass and a bed, it may be only of four o'clocks and poppies, comes to view.

The vicious, coarse, vulgar and depraved may live in homes embowered and adorned by nature's choicest gems which their own hands have planted, but our minds reject the belief as incongruous and unnatural. There is no farmer favored with health who cannot find hours of leisure sufficient to enclose a little space around his dwelling, and if he can do no more, plant such trees, shrubs and vines as he may find in the nearest valley. An ivy or a wild honeysuckle trained around the porch or over a window shuts out the fierce heat and glare of the summer sun.

A rustic arbor is the work of but a few hours. Grapes planted here afford both shade and fruit. A wild climbing rose will clamber along the paling fence, a row of hollyhock form a background for hardy perennial flowers, and a few seeds of annuals may be had for the asking. Cedars from the rocks will form an evergreen clump, or screen from view an unsightly object.

Visitors to the World's Fair were impressed by a picture in the art gallery. It was the "Breaking of Home Ties." The picture has a soul, and hundreds have stood before it with moistened eyes. Even the dog and cat on the canvas showed a downcast expression as father and mother, brothers and sisters, bade good-bye to the young man about to leave them for the field of his life-work. Is it not worth the while that the boys and girls who go out from us shall carry with them a mental picture of home and its surroundings that shall come back in later years as a pleasant memory? The picture need not be large or grand. The one to which I have referred in the gallery was smaller and less assuming than many others. So the humble cottage, with its cool shade, its green trees, its flowers and clambering vines, may be the picture with a soul, dearer and more enduring than that of the city mansion, however grand.

It is true, times are hard—with some they always are—but I believe there are few among us who cannot, as the spring approaches, plan some improvement in the surroundings of home, which will come within our reach. The monuments placed on our graves will grow dim and crumble as the years go by, but the trees we plant will grow when we have returned to dust, and their beauty and their shade will refresh and make glad those who shall live after us.

All this may be done without neglect of the farm, and will furnish relaxation rather than an increased burden of toil. This, with me, is no mere theory or flight of fancy. My earlier life was spent on a farm, which at first was but a blank space on a treeless prairie, with only the labors of father and sons to make it otherwise, but it was done.

Yet the cheerless homes of which I have spoken are not altogether those of the poor. Not a few of our well-to-do farmers live in the midst of desolation indescribable and inexcusable. For them nature's choicest products from every land have been gathered in nurseries and gardens within their reach, and offered at a trifling cost. Why are they not obtained? "I do not care for such things, they don't pay," is the answer. These people do not understand their own capacities; they may care and enjoy. Men and women are not so dead to the beauties of nature as they may imagine. Care and enjoyment grow with what we plant, and we are surprised to find ourselves interested in what had seemed most uninstructive. Then again it does pay. No equal investment of time and money adds a greater percentage to the salable value of the farm than its proper embellishment by means of ornamental planting, to say nothing of the increased comfort and satisfaction enjoyed during all the years of occupancy.

The Cherry.

BY J. A. DURKES, WESTON.

Cherries are commonly known as the sweets and acids, the former being of type of the Black Heart, Black Tartarian, Gov. Wood, etc.; the latter, that of the Morellos, Early Richmond, etc. The best situation in which the cherry tree thrives is one of an elevated and well-drained character. In nowise will they do well upon low places with damp and heavy soils.

The cherry will thrive in a variety of soils where perfect drainage can be had, but a gravely, sandy soil with a loamy consistency seems to be the best. Some of the sections of country suitable for growing the cherry are the poorest ridges, with slaty and limestone formations.

The Heart varieties will only thrive upon such soils, as a very slow growth and early ripening of the wood is necessary to withstand the changes of winter, in our latitude at least.

The acids will bear soils of a much richer character, and dressings of lime, ashes and stable manure will prove a great aid in producing abundant crops of fine fruit.

The distance for planting may vary from 15 to 20 feet apart. Ordinary preparation of the soil is sufficient; the holes should be of ample width to admit the roots freely, with room to spare, and deep enough so that the tree may be planted below the union of stock and bud. In selecting trees from the nursery, always prefer those that are worked very close to the ground; we thereby save much trouble with the sprouts that are prone to grow up from the stock at the collar.

After three or four years' planting, the culture should be very shallow, but perfect cleanliness must be followed; no harboring place should be given to our insect foes.

The cherry is a most desirable fruit, healthy, juicy, with such delicate flavor, that renders it very acceptable to all. Being the first fruit of summer (excepting the strawberry) makes it the more welcome. In view of these desirable properties, and the profit of the fruit for market, it is indeed surprising that it has not shared a greater attention from the fruit-growers, or rather, from every one that plants trees for home use or marketing on a larger scale.

As to profit, we have no figures at hand from any large grower at present, but we feel safe in saying that it will be very large. They seldom fail to bear; they even will stand any amount of neglect, and under these conditions give an annually fair crop, and fruit that enters into many uses in household economy, besides the great demand of the fruit as a relish. We want only to produce it in quantities in such proportion that it can be offered at moderate rates. A taste once established, the demand will grow faster than the supply.

For marketing, the fruit is plucked with the stem adhering; should not be gathered when the dew is on or moist from fogs or rain. Baskets holding a peck or third of a bushel are used for near markets, while for more distant the 10-pound (grape) basket, or crates holding 24 quart boxes. There is a crate made holding four or six baskets five or six pounds each.

Varieties to plant is an unsolved problem. We would recommend with great reluctance but three or four kinds for general planting, but a trial of others in different localities. Of the sweet or Heart cherry, the Black Heart, Tartarian, Gov. Wood, Windsor, Elton and Yellow Spanish have done well. Of the acids, the Early Richmond heads the list, the May Duke is an old favorite, Reine Hortense, English Morello, Ostheim, Montgomery and Olivet. For profit we would prefer the acids, and those here named have been tried, succeed well, and take us through the season.

Thus in a few words I have tried to call your attention to the importance of this time-honored fruit; its enemies, and how to rid ourselves of them, we leave to your discussions. In the ornamental, combined with the useful, the cherry is found to possess better qualities than any other of our fruit-trees, hence its extensive use as a shade tree in door-yards and home grounds.

Grapes, New and Old.

A review of grape varieties was given by Geo. W. Campbell, of Ohio. Of all the seedlings of the Concord, none have superseded it as the most important for general planting. Worden is the best in the lot, seven to ten days earlier, but not better, and with the same defects. Moore's Early is not as productive, but being two weeks earlier, may be recommended for cold sections. Eaton makes a strong vine, large foliage, large clusters and berries, but is later than its parent, and not as good. Among the white seedlings of Concord, we have Lady and Pocklington. The former wants good fertile soil, and then excels in fine quality and earliness. Pocklington has many merits, but is from seven to ten days later than Concord. Woodruff Red, a red Concord seedling, is vigorous, hardy, productive, not of finest quality, but good enough for average taste. Much has been said against it. Possibly eastern soil is not suitable for it. Still it makes its way into public favor. When well ripened, it is equal to its parent. Brighton is healthy, vigorous, giving large and handsome clusters of fine quality. It is not quite hardy in severe winters; has reflexed stamens, and is not a good keeper. Moore's Diamond, a white grape, has given satisfaction in many places. It is a good grower, hardy, and of excellent quality. Niagara is a strong grower, has healthy foliage, and handsome, well-formed clusters. It is quite profitable, but does not endure severe winters without protection. Empire State has not fulfilled its expectations. Ulster Prolific is a handsome red grape, ripening with Concord. Nectar, a Black Delaware, is worthy of trial, quite hardy, with healthy foliage; clusters and berries are of medium size, ripening with Delaware. Vergennes has held its own or rather increased in popularity. It is of good quality, although not of high flavor, a good keeper, and retains its flavor well. Green Mountain, or Winchell, proves very promising for an early variety; indeed, one of the most promising of all recent introductions. The Mills is one of the few which Mr. Campbell has been unable to grow after repeated trials. Moyer, from Canada, resembles Delaware, but has not made much advance in popular estimation. Notwithstanding its earliness and good quality, Mr. Campbell can see little in it to recommend planting it. Has fruited the Brilliant, one of T. V. Munson's grapes, for three years. It excels in vigorous growth, healthy foliage, and great productiveness. In color it resembles Delaware, and almost equals it in quality. G. W. Campbell, a white grape of good quality, is a moderate healthy grower.

Quite instructive are Mr. Campbell's experiences in crossing Concord and Delaware. His aim was to obtain an improved Concord. Several varieties were thus obtained which at first seemed to combine the desired qualities. One of these afterward developed the fault of shelling the berries. Another had too many and too large seeds, etc. Mr. Campbell thinks that new varieties have been introduced too lavishly. Many sorts should be weeded out, and none introduced except those having important points of merit, and are better in these respects than what sorts we already have. He has, however, full faith in the improvement of American grapes, and expects that sometime we will have grapes suitable for all sections, and as good as any produced by any other nation in the world.—American Gardening.

Japanese Plums.

The discussion on the value of Japanese plums was free, and apparently exhaustive. That this class of plums is of the greatest promise can no longer be questioned. S. D. Willard, although not yet ready to recommend general wholesale planting, says Japanese plums can be grown with profit in New York state. Burbank is better than other Botans, and Yellow Japan still better than Burbank. Trees of these plums do not seem to be as liable to be troubled with black knot as ordinary plums. The fruit is thin-skinned and good enough in quality. The Botans bloom early, and therefore are liable to be hurt by late frosts. C. M. Hooker says this is also his experience. Neither are they curculio proof; trees are hardy. Sweet Botan (Abundance) is as good as Lombard; a good keeper and shipper. It has healthy foliage and is free from disease.

Ogon is a yellow plum, the poorest in quality of all. It looks nice and is early. Henry Lutz calls it the best canning plum. It sells well, remaining in good condition for several weeks. Burbank and Sweet Japan, in Niagara county, ripen in August. The fruit can be picked green and shipped. It will ripen well and be of good flavor. Willard (Botan 26), the earliest of all, ripens in July. Prof. Bailey thinks it will be the coming early market plum. Satsuma is a good late sort, purple all the way through, but not yet tested enough. Prof. Bailey calls the Burbank better in quality than the Lombard, and Sweet Botan (Abundance) as good. These Japanese plums, he says, are the coming fruit. They have fruited in Iowa after being exposed to a winter temperature of 26 degrees below zero. J. H. Hale says that for profitable market plums the Japanese varieties hold out the best prospects. They are better keepers and shippers than European plums. Prof. Craig, of the Experimental farm at Ottawa, Canada, says he has tried all Japanese sorts, but only one, an early Botan, outlived a winter temperature of 32 below zero. He is now trying them top-worked on native plums.—American Gardening.

JAPANESE PLUMS IN AMERICA.

It is now about 25 years since a Mr. Hough, of Vacaville, California, secured, through one of our consuls, a variety of plum from Japan, which has been the forerunner of a race which is destined to be a great blessing to this country. This is now called Kelsey, but an intelligent Japanese horticulturist told me that at home it was called "Hattan," or "Hatan." Mr. Hough died not long after this, but in the meantime he had sold the entire stock of this plum to Mr. John Kelsey, of Berkeley, Cal., who left the trees in the nursery row until they bore fruit. This was as early as 1876, for Prof. E. W. Hilgard wrote me that Mr. Kelsey showed him specimens that year, and he also gave to Mr. J. Wickson the next year. It soon became known, and the variety was generally distributed, not only in Calfornia, but in the Eastern States. Mr. Kelsey died also; and as he had been instrumental in introducing the fruit, it was named in his honor by the pomologists of California.

In the East it did not prove hardy except in the Gulf states, and along the Atlantic coast as far as Chesapeake bay. At present it would be inadvisable for those living in the South to plant it, except where the hardier kinds of the fig will succeed. The fruit is very large, specimens sometimes measuring three inches in diameter. The frost is apt to kill the blossoms which come out very early in spring, and the fruit ripens unevenly. The latter trait is no objection to the variety for home use, but makes against it for market.

But other and better varieties were soon after imported. Mr. J. D. Pryal and Mr. Jas. Shinn, of California, were the first, so far as I know, to grow collections of these new-comers. Both of them had varieties which bore fruit varying in shape, color and flavor from Kelsey, and from each other. Some were bright yellow and others dark red to the stone, and very sweet. Nearly all of these are now under general trial, with every promise of success, and a few have passed beyond the experimental stage, and are being planted in commercial orchards. This is especially true of Sweet Botan (also called Abundance), Ogon and Satsuma.

But the most popular of this class is one that was imported by Mr. Luther Burbank, of Santa Rosa, California, in 1885, among a lot of seedlings. When the tree came to bear, the fruit was so handsome and good in quality that, at my suggestion, it was named in his honor and sent out for trial.

Mr. Burbank at once began crossing these Japanese plums with our native American species and the varieties of *Prunus domestica*. And herein lies the greatest good that we are likely to get from the introduction of these foreigners. Already Mr. Burbank has produced and sent out for trial a few very promising varieties as the result of his experiments, and others are taking up the same line of work. It would be a great pleasure to any one interested in horticulture to procure and examine the catalogue issued by Mr. Burbank entitled "New

Creations." Whoever does so will see, at a glance, that he has not been idle, nor is he any novice in such work, for although yet a young man, it was he who, many years ago in Massachusetts, originated the Burbank potato.

The Japanese plums cross very readily with our own, and it is not improbable, as Dr. C. B. Dennis, of Cedar Rapids, Iowa, has lately suggested, that they are closely allied botanically with the American species, and originated from a common stock. This theory, in a general way, had been advanced long ago by scientists, who have thought that the continents of Asia and North America were once united, and that their native plants were separated by the encroachment of the sea. Physiological study of the wood, leaves, and seeds of the plum long since convinced me that they were much more like our own than the European varieties.

However interesting this subject may be to botanists, it is of the most practical importance to the fruit-growers of this country. All the Japanese varieties, and their progeny, are being tested, and a few leading spirits are giving them special attention. Among the foremost in the South are J. L. Normand, of Marksville, La.; G. L. Taber, of Glen St. Mary, Fla.; P. J. Berckmans, of Augusta, Ga., and T. V. Munson, of Denison, Texas. To the ordinary farmer or fruit-grower, who may wish to plant a few trees of these novelties of Japan, let me say, do not be afraid to give them a trial. A few kinds may be planted with safety. Among these are Burbank, Ogon, Sweet Botan, Satsuma and Yosobe, all of which will succeed from the Gulf of Mexico to the great Northern lakes.

H. E. VAN DEMAN,
In Southern Planter.

Parksley, Va., Jan. 12, 1894.

Protoplasm.

S. M. FARNUM.

What is life? The most that wise men can tell us is that the origin of life is something which they call by the queer name of potoplasm. If you have a microscope, put under it a drop of water from some pond, and look among the tiny beings with which it swarms for a little speck of jelly nearly round. If you watch it patiently you will see it slowly change its shape; now it is three-cornered; now it is covered with little knobs; now it seems to be of no shape at all. This is a living, feeding creature. It is what scientific men call a simple life-cell.

Our bodies are built up of countless numbers of just such cells. They are working all the time—growing, dividing, twisting, turning and weaving themselves into graceful shapes. Upon these motions depends the life of our bodies. Learned men call the matter of which these cells are composed, protoplasm.

When you cut your finger, a crowd of little cells go to work at once to repair the rent in skin and muscle. In a little while these tiny toilers have covered the wound with a colorless glue, and under this they make a new layer of skin. If for any reason these cells are not able to heal a wound, there is left a running sore of dead cells.

These busy workers know no rest. They are working to make your body grow, to heal injuries, to repair waste. Each set of cells has its own work to do. Some are making skin, some hair, some toe and finger nails, some muscles, some bones. They are not only workers but soldiers, fighting continually to defend you from the attacks of invisible enemies—that is, invisible except by the help of the microscope.

In the air, in the soil, in the water, in and on living bodies, are multitudes of minute beings called microbes. Very few of them are hurtful, but some of them cause disease. When our bodies are attacked by armies of those bacteria which are our deadly foes, then the little cells in our bodies act as soldiers and fight to protect us. Just think of the battles fought for you that you know nothing about, to defend you from unseen dangers.

The wonderful substance called by that odd-sounding name, protoplasm, builds your bodies, gives them life, works for you, fights for you. It builds, works, fights, unseen and unheard. But marvelous as are its doings, it is only one of God's wonderful workers. Truly "He moves in a mysterious way, his wonders to perform."—American Gardening.

Ripening Keiffer Pears.

"As to ripening the Keiffer for eating, I certainly have no particular process, and yet they do come out nice, and people are pleased with them.

"We handle them much the same as I would any late pears—namely, allow them to hang on trees until well matured, pick very carefully, handling so as to avoid danger of bruising, usually picking directly into bushel boxes, which are carted into the fruit barn, when they are stacked up one box on another and permitted to remain undisturbed until there is a disposition to color, when they are sorted directly into kegs for shipment—at all times handling with as much care as if they were eggs.

"Those designed for home use are taken to the cellar and taken up into a warmer temperature to ripen when wanted, which they will do in a day or two, with fine flavor. The masses of the people have been led to regard it as a worthless fruit, while a few like myself have been growing it for market with quite a degree of confidence, which, with me, is increasing annually." S. D. WILLARD,
In Am. Gardening.

The Outlook in the Fruit Industry

Is discouraging only for the producer of poor fruits. Careless and slovenly growers are being fast weeded out of the business. As one of our exchanges puts it, there is no money in trying to grow poor fruits cheap, allowing nature to do all and man nothing. What nature does in such cases is to multiply insect enemies and fungus diseases. If nature is to do all, then nature will take all and leave the lazy member of the firm nothing. On the contrary, if man will work with nature, combating insects and diseases, the fruit will be so much finer that it sells itself at good prices, while the poor fruit can hardly be given away. The best fruit can now, under careful treatment, be produced more cheaply than it was in a state of nature. Now it can be guarded so as to be pretty sure of a crop every year. All prominent fruit-growers are agreed on taking this view of the situation. Moreover, it has its exact parallel in the vegetable industry.—American Gardening.

INJURIOUS INSECTS OF THE SEASON OF 1893.

BY MARY E. MURTFELDT, KIRKWOOD, MO.

Entomologist of the State Horticultural Society.

INTRODUCTION.

The list of insect depredators of the past year includes not only the ever-repeated story of "Canker-worm, Codling-moth and Curculio," but several species with whose destructive work we had within the boundaries of our State, no, or but very slight, previous acquaintance. Among these the Buffalo Tree-hopper, the Osage Orange worm, the Grape-vine Scale and the Horn Fly are fully treated in the following pages, while a few others of which much complaint was made, such as the Peach-tree Scale, the Fruit Bark-beetle, a Clear-winged Apple-borer, received from Mr. Gilbert, and several large caterpillars, which were locally very injurious, have been reserved for a future paper, after the collection of futher data and more careful study and experiment.

The appearance and habits of all the pre-eminent orchard pests are now familiar to most intelligent orchardists, but there is still a great diversity of opinion concerning methods of eradication. Spraying with the various arsenites, while efficacious upon the pip-fruits, has proved more or less dangerous to all varieties of stone-fruits, and cannot be recommended for general practice as a remedy for Curculio. If the use of Paris-green spray upon peaches proved disastrous in the hands of one so systematic, thorough and careful as the proprietor of the Flint Hill fruit farms (see Mr. Gilbert's paper on the subject), nothing, surely, is to be hoped for it as applied hurriedly and irregularly by the general orchardist.

We may as well acknowledge that the Curculio problem is still unsolved. North America is the home of the insect, and while, unlike the aborigines of higher orders of animals, its welfare and multiplication are promoted by the accessories of civilization, when these fail it has other resources, and consequently has, so far, proved invincible by any methods of warfare devised by the horticulturist or entomologist. We can hope, at most, only to keep it in check, and—though this assertion may seem very unprogressive—in the opinion of the writer, the old methods of trapping, jarring, and, especially, the prompt collecting of all fallen fruit, are still the safest, surest, as well as the least expensive means of reducing its numbers. Extermination is hopeless in this case of an insect that can, at a pinch, breed in grapes, gooseberries and black-knot.

In the case of the Codling Moth the outlook is far more hopeful. The foliage of apple and pear is not injured by applications of Paris green in liquid suspension sufficiently strong to kill the newly-hatched larvæ before they make their way into the fruit. During the past season it was also discovered that this insecticide could be advantageously combined with the Bordeaux mixture or other approved fungicides, so that the same application would answer for several species of insects and for apple-scab, powdery mildew, leaf-blight and similar diseases.

I must repeat what I have so often said, that the great need of horticulturists and farmers is a plan of concerted effort in the treatment of insect pests. One neglected orchard within a radius of five miles can annually undo the work done in twenty that are systematically cared for. Neighborly combination in labor and interchange of ideas and experience on these matters would be of incalculable mutual benefit. Independence is out of the question in these matters, and it would even pay the more enterprising fruit-growers of any locality to spray the orchards of those who are unable to do so at their own expense, rather than not to have it done.

In thickly-settled localities or villages, where each resident has but a small orchard or a few scattered trees, it would certainly be profitable for some member of the community to procure a spraying outfit and the materials for the various insecticides and fungicides, and go about applying them, at the proper season, at a certain price per tree. Even where but little attention has been given to these matters a demand for service of this sort could soon be created, and the convenience of it would be highly appreciated.

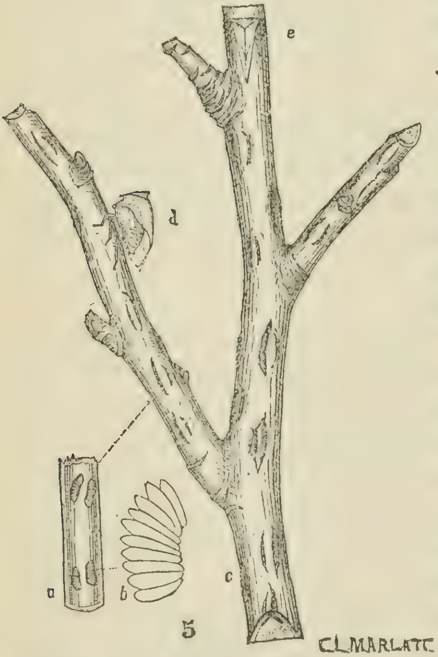
The preservation of insectivorous birds and all innoxious reptiles should be insisted upon by county and town governments, and a knowledge of the principal forms of predaceous and cannibal insects disseminated through the public schools both of town and county. We need all our natural allies in our warfare on the enemies of our agricultural and horticultural products; and yet, how often these are mistaken for the depredators and indiscriminately slaughtered.

The Tiger-beetles and larger Ground-beetles, which prey upon the larvæ of many pests that enter the ground for transformation, are easily recognized. So are the Lady-birds or Lady-bug beetles, the Lace-wing flies and Syrphus flies that devour such a vast number of plant lice and scale insects. Mantes and Wasps also render effective service in the same line. These should be familiar to every fruit-grower, in order that they may in all cases be protected.

It is requested in conclusion, that any member of the Horticultural society, or any person who may read these lines, whose fields, orchards or gardens are attacked by insects unknown to him, and who desires a remedy for the same, will send specimens securely packed in tin or wooden boxes, and accompanied by a description of the injuries done, to the writer, who will be glad to give all possible information.

The Buffalo Tree-hopper *(Ceresa bubalus,* Fabr.)—The accompanying cut graphically depicts a series of peculiar scars on the young wood of apple-trees, with which many of our orchardists and nurserymen are only too familiar. It represents the work of the small jumping insect named above, a species of the Whole-winged division *(Homoptera)* of the True bugs.

Fig. 1.

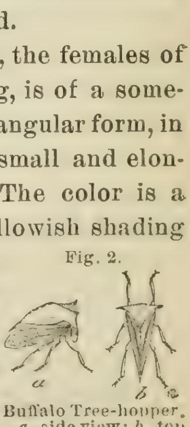


Scarred twig of apple with *a*, eggs natural size; *b*, same enlarged; *c*, old scars; *d*, insect placing eggs; *e*, back view of same (after Marlatt).

It has been known in collections for more than 100 years, but has only recently taken rank as an important pest of the orchard, and, while it occurs in all parts of the United States and Canada, its attacks are peculiarly local, being commonly restricted to a single neighborhood or to a single orchard in that neighborhood.

The perfect insect, the females of which do the cutting, is of a somewhat humped-back, angular form, in shape not unlike a small and elongated beech-nut. The color is a dull green, with yellowish shading along the sides and about one-third of the transparent wings exposed when folded near the posterior end of the body. The accompanying side and back view (Fig. 2) from the skillful pencil of Dr. Riley will enable the observer to recognize it at once. The stout, pointed ovipositor being closely sheathed when not in use could

Fig. 2.

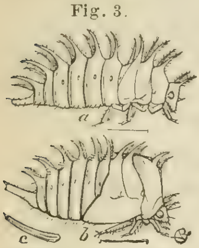


Buffalo Tree-hopper. *a*, side view; *b*, top view (after Riley).

not be shown. The popular name is derived from the projecting horns on the prothorax.

The first orchard suffering seriously from its attacks, that came under my observation, was that of Mr. G. F. Luckhardt, of Oregon, Mo. At the summer meeting of the State Horticultural Society in that city in 1888, specimen twigs and branches were exhibited showing exceedingly disastrous work. The branches were cut and scarred almost continuously from base to tip, both two and three-year-old wood being involved, and the scanty foliage that had put forth was yellowed and wilted from the effects of innumerable punctures in the petioles and principal veins by the young larvæ.

Fig. 3.



Buffalo Tree-hopper *a*, larvæ; *b*, pupa; *c*, ovi-positor — all enlarged (after Riley).

The latter do not in any particular, except in beak and legs, resemble the mature insect. Dr. Riley describes them as "at first brownish, with a formidable row of ten pairs of compound spines. After the first and second molts they are still furnished with these sprangling spines, but are of a paler color, with some transverse, lilac-colored lines. With the third molt they assume the pupa state, in which the wing-pads become conspicuous and the prothorax is produced into a point behind. With the fourth molt, which takes place toward the end of July, the characteristics of the mature insect are acquired." The above description of the immature forms was published by Dr. Riley in 1873, in his fifth report on the Insects of Missouri, but to Mr. C. L. Marlatt, at present of the U. S. Division of Entomology, but formerly of Kansas, belongs the honor of having first observed and described the processes of oviposition, which he also correctly delineated in Fig. 1. The account was published in the Kansas Academy of Science, Vol. X, for the loan of a copy of which, as also of the illustration pertaining to it, I am indebted to the kindness of Prof. E. A. Popenoe, of Manhattan.

Oviposition takes place through the months of September and October, and the mode of procedure is described by Mr. Marlatt as follows:

> "The female chooses by preference a twig of two or three years' growth, not, however, confining its work to twigs of this age. Eggs are deposited quite as readily in the new growth of old as well as young trees, and my observations would lead me to believe that certain varieties, owing to differences in the texture of the bark, are more liable to be attacked than others. During oviposition the female may head away from or toward the trunk. (Fig. 1, *d. c.*) A slightly curved slit through the outer bark is started with the ovipositor at right angles to the body, and the cut is made from the point of insertion posteriorly, the ovipositor constantly assuming a more and more slanting position as the cutting proceeds, till,

at the close, it lies almost against the abdomen. At the beginning of the operation the body is raised on its limbs and sways from side to side, but as the cutting continues backward the vibratory motion ceases somewhat and the abdomen is lowered, till on the completion of the slit it rests on the twig. The insertion of the eggs immediately follows. Beginning at the end of the slit last made, the ovipositor is thrust down through the bark, reaching the cambium layer—the abdomen of the insect resting on the limb, inclined in the direction of the ovipositor. At intervals of from one-half to two minutes, the ovipositor is drawn forcibly forward and sometimes partly out of the slit, and then reinserted. By noting the number of times this movement was repeated, it was found to agree with the number of eggs in the slit. The making and filling of the first slit requires from 20 to 25 minutes, after which the ovipositor is entirely withdrawn, and a second slit, shorter than the first, parallel to and curving toward it, is made without change of position by the insect. The insertion of the ovipositor and introduction of the eggs in the second slit are as described for the first, after which a rest of considerable length is taken before the insect again begins work. The eggs are whitish, slightly curved, each 1-16 of an inch long, arranged in two parallel rows of from six to ten each, separated by a narrow strip of bark."

The above circumstantial account will enable the orchardist to understand how and for what purpose the cuts are made. The insects are somewhat gregarious, and the work of one often follows on the same branch that of another. In the case of the work of the insect, as observed in Oregon, Mr Luckhardt's orchard was the only one out of hundreds in that section upon which it was seriously injurious, and Mr. Marlatt made the same observation of the orchard near Manhattan, where his studies of the insect were pursued.

During April and May of 1893, I received many letters of inquiry concerning the scarred twigs on which *Ceresa* had oviposited, including some from our honored secretary, Mr. Goodman, Mr. Gilbert of Thayer, Mr. Gilkeson of Warrensburg, Mr. Groff of Iberia, who writes "There is something working in my orchard and I send you a piece of limb affected. The trees are three years old and are stung all over. Can you tell me what it is and give me a remedy for the same?" Mr. Gilkeson says in regard to the specimens sent: "They are from the orchard of Dr. S. P. Cutter, and he has 2000 trees that are affected in the same way." These letters show that the insect has really become, in some orchards, a most formidable enemy, requiring energetic fighting. I have not been able to obtain evidence substantiating Mr. Marlatt's suggestion that the insect preferred one variety of apple over another in placing its eggs. In orchards such as those mentioned in the above extracts, it is more than probable that several varieties were included.

Mr. Goodman, of all my correspondents, alone named the variety of tree, the Willow Twig, from which the injured twigs were taken.

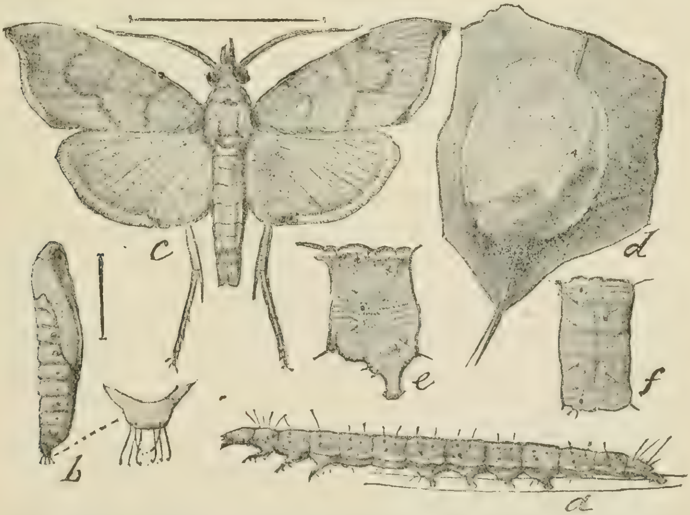
The only preventive measure that seems practicable is severe pruning and burning of the affected twigs during winter and early spring; while spraying with much diluted kerosene emulsion would undoubtedly kill the young hoppers that are found upon the leaves in summer.

The insect does not confine its attacks to the apple, but works upon willow, sassafras, plum and cherry, as well as on various other plants—this general feeding habit rendering it all the more difficult to overcome.

Mr. Marlatt bred a dipterous parasite from the eggs, and I have obtained from the same numerous specimens of a minute Hymenopter , an undescribed species of *Cosmicomia*, according to Dr. Riley, to whom it was sent for determination ; but these natural checks are scarcely of sufficient importance to warrant the keeping of the twigs until they hatch, especially as they do not appear until long after the larvæ have developed.

The Osage Orange Pyralid *(Loxostege macluræ,* Riley).—In journeying back and forth over our State, one cannot but admire the beautiful and fairly well-cared-for hedges that outline and divide so many of the large farms. Where barriers are indispensable, nothing is so harmonious in a landscape as a wall of luxuriant green, close-trimmed, not to obstruct the view, with lower branches intertwined so that even a chicken can scarcely penetrate it, yet with a fringe of slender terminal twigs to respond to the breeze and break the too formal outline. Of all hedge plants the Osage Orange is the favorite throughout the Mississippi valley, and justly so, on account of its hardiness, rapidity and luxuriance of growth, its thorny stems and glossy, dark-green foliage,

Fig. 4.



Osage Orange Pyralid: *a*, larva; *b*, pupa; *c*, moth; *d*, cocoon—all enlarged; *e*, side view of segment of larva; *f*, dorsal view of same—still more enlarged.—Insect Life.

and many other valuable qualities. Another of its great merits has been that, until recently, it has had no important insect enemies, and none that were peculiar to it. Occasionally a stalk would be found bored by the larvæ of the handsome longicorn beetle, *Dorchaschema wildii,* or infested with the scales and cottony tufts of *Pulvinaria innumerabilis,* or a few leaves gnawed by tree-crickets or rolled by leaf-rollers ; but none of these seriously affected its vigor or appearance. During the latter part of the summer of 1890, however, many of the hedges of St. Louis county showed rusty spaces which became leafless early in the autumn. Examination revealed extensively gnawed and perforated leaves, and threads of web in which grains of frass were entangled, but the mischief-maker could not be discovered.

But the following year, when the same work began to appear on the hedges early in the season, and more generally and conspicuously than ever, it was after cautious scrutiny traced to the presence in great numbers of small, slender, watery-green larvæ, which, while young, extend themselves so closely along the midrib and veins of the under side of the leaves, that even the practiced eye could not easily detect them. They remain thus motionless during the day-time, feeding for the most part only at night. As they increase in size, they have the habit of deserting the outer leaves during the day, and resting on the inner stems and branches, whose color, especially after the last larval molt, they closely imitate. In passing back and forth they spin a great deal of fine but strong, gray web, apparently guiding themselves, like Theseus through the labyrinth of ancient fable, by means of these threads from their inner diurnal retreat to the fresh outer foliage to which they came at night for food. Possibly, also, this carpet of threads affords them surer footing than the uncovered stems.

In the course of the summer of 1892, I was able to work out the complete life history of the insect, an outline of which was published in "Insect Life," accompanied by a technical characterization of the species, which was a new one, by Dr. Riley, who had previously collected it in Texas.

The parent moth appears on the wing early in the spring, and deposits its eggs in clusters on the under sides of the young leaves. From these eggs hatch tiny translucent green, very slender caterpillars, which upon the slightest disturbance curl up cut-worm fashion and drop to the ground. If not interfered with they remain, either in a single cluster or separated into two or three groups, feeding upon the green tissue of the leaf, causing transparent spots to appear from the upper surface.

The first molt takes place in five or six days, after which the minute worms scatter more or less over the neighboring leaves, which reveal their presence by numerous irregular perforations. Until about one-half grown they do not wander, but rely for safety upon their position stretched along the veins of the leaf and their pale-green coloring, which corresponds so exactly with that of the under surface of the latter. After the third change of skin, however, they become somewhat darker and more opaque, and after feeding all night, retire for the day to the seclusion of the interior of the hedge, where, as has been said, their brownish-gray and mottled coloring renders them practically invisible upon the principal stalks and branches where they rest. In about three weeks from the date of hatching, they are full grown, and enclose themselves in large, loose cocoons of fine-textured web of a pinkish or dingy white color, formed against the larger stems or among clusters of fallen leaves on the ground. Within these cocoons the summer broods rapidly pass their transformations, giving forth the moths in 14 or 15 days from the date of spinning. As the development is somewhat irregular in the spring, the insect may be found in nearly all of its stages from the last of May till the first of October. The latest autumn brood passes the winter enclosed in its thin but tough cocoons, on or near the ground.

The injury to the hedges of the State during the past two seasons has been such that some of the owners are having them grubbed out, and unless more general attention is given to the matter during the coming year, both their beauty and their value as fences will be a thing of the past.

The remedy is found in thorough and repeated spraying with Paris green, or some of the arsenites. This must be done so as to wet all the foliage, if possible.

The summer pruning should be done about the first of August, at which time very few worms will be feeding, but many egg-masses will be found on the under sides of the leaves, and when the latter are burned, the second summer brood of defoliators will be greatly reduced in numbers.

As yet, this pest has not many enemies among the predacious or parasitic insects. That redoubtable bug, the spined soldier-bug *(Podisus spinosus)*, is often found with the larvæ impaled on its beak, and no doubt drains the life fluids from a very considerable number. A few larvæ, parasited by a small Ichneumon fly *(Bracon juglandis*, Ashm.), have also come under my notice, and, in time, it will no doubt have other enemies in its own class, as well as among birds and small reptiles.

For the benefit of those interested, I append the following descriptions of the several stages of the insect, adapted from my notes in "Insect Life," Vol. V, p. 155, and Bulletin No. 30, U. S. Dep't of Agr., p. 51.

Eggs—In irregularly shaped masses of from 20 to 50, circular, flat, pale-yellow, each with a delicate, semi-transparent, membranous border, over-lapping each other, fish-scale fashion. As the embryo develops, each egg acquires two minute black lines or marks.

Larva—Newly hatched one-twentieth of an inch long, almost transparent greenish-white—in second and third ages becoming more opaque, but still with a very glassy-looking surface, and showing a sparse dotting of black. Full-grown larva from eight to nine-tenths of an inch long by about three-twentieths inch in diameter when crawling, somewhat contracted and broadened in repose. The form is subcylindrical, tapering slightly toward either end. The color at this stage is variable, in some specimens translucent pinkish, in others dull green, and again of the gray-brown shade of the bark of the older wood, always obscurely striped on the dorsum and sides, with a darker shade of the ground color, and having a narrow but distinct ivory-white stigmatal band. Piliferous dots black, surrounded with a paler ring, largest just above the stigmatal band, four in sub-dorsal spaces on eleventh segment being in the hollow of conspicuous crescents convex toward the sides. Head narrower than thoracic joints; cordate, with rounded lobes of a pale-brown color, with irregular stripes in a somewhat darker shade; mouth parts dark-brown; legs and prolegs same color as general surface.

Cocoon—Of various shapes, rather loose and baggy, of fine texture and thin, but very strong; pinkish or brownish-white, spun against some flat surface or among crumpled leaves.

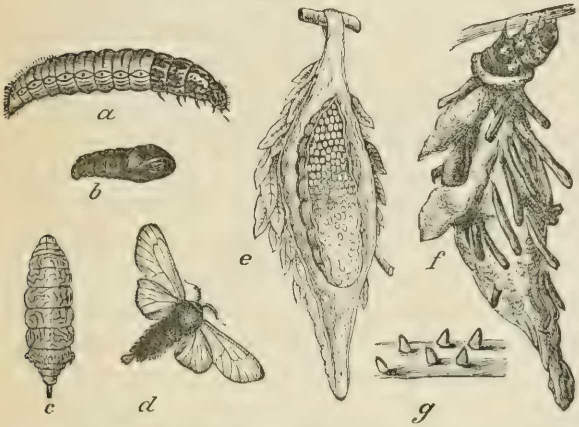
Pupa—From one-half to six-tenths inch in length; very slender, with slight corrugations, and teeth on the posterior edge of the joints, and of a bright brown color.

Moth—Expanse of wings seven-eighths inch; fore-wings satiny in texture, of a pale, brownish-gray, sometimes, when the insect is perfectly fresh, faintly tinged with green or roseate, and always crossed by three curving, wavy lines of a more dusky shade—the outer margin, back of the very short white fringes, being also dark; hind-wings similar in color to the fore-wings, but thinner, without the dark cross lines, but with dusky shadings on the lower edges; body long and slender, brownish-gray above, satiny-white beneath, with long terminal joint, which is upturned and tufted; head narrow, with projecting, beak-like palpi, margined with white, very long tongue, large hemispherical eyes of a mottled dark-brown color, and slender, tapering antennæ three-fourths the length of the wings; legs long and of a satiny-white color.

Dr. Riley's more technical characterization of the species may be found in the volume of "Insect Life" referred to above.

The Bag-worm or Basket-worm (*Thyridopteryx ephemeræformis*, Haw.)—The singular and destructive insect named and figured here has been attracting very general attention during the past two summers. So far as Missouri is concerned, a very large proportion of the entomological inquiries addressed to me last summer related to the habits and remedies for this insect, while visitors from the country frequently brought specimens with accounts of its extremely destructive work on evergreens and other trees.

FIG 5.



Bag-worm in different stages of development. *a*, caterpillar (larva) taken out of case; *b*, pupa; *c*, legless and wingless female moth; *d*, winged male moth; *e*, case filled with eggs; *f*, full-grown larva in case; *g*, newly-hatched larvæ in tiny conical cases (after Riley)

Besides the very appropriate names of Bag-worm and Basket-worm, it is also called the Case-worm, Evergreen Cone-worm and Drop-worm—the latter from its habit, when full-grown, of dropping from the trees on which it fed, upon the passer-by. It was also dubbed last season, by newspaper reporters in some of the interior towns, the "Missouri Silk-worm." The Bag-worm occurs in all parts of the United States east of the Rocky mountains, except in the extreme north, but finds its most congenial climate between latitudes 30° and 40°. Until recently it was considered the especial pest of the shade-trees of cities, and was often the most serious obstacle to the thrift and beauty of those planted for ornament and shade of parks and avenues. But from the cities it has slowly spread countryward to the grounds of suburban residents and farms, until it is now to be found in many of the forests, especially those intersected by railways—the latter having been, no doubt, the unconscious means of its dissemination. While its marked preference—where it has opportunity for the exercise of preference—is for the foliage of evergreens, especially of Red cedar, it feeds and thrives upon almost all variety of deciduous trees and shrubs, and often proves a serious orchard pest.

The development and habits of the insect are peculiarly interesting. During the month of May, in the latitude of St. Louis, tiny dark caterpillars appear from many of the bags that may be seen in winter hanging from the twigs of trees. Almost their first activity is to begin the formation of a case or cover for the hinder part of the body. The process is described by Dr. Riley, in a popular account of the insect in his first Missouri report, as follows:

> "They crawl onto a tender leaf, and, attached by their anterior feet, with their tails hoisted in the air, they spin around themselves a ring of silk to which they soon fasten bits of leaf. They continue adding to the lower edge of the ring, pushing it up as it increases in width, till it reaches the tail and forms a sort of cone, as represented at *g* in the figure. As the worms grow they continue to increase the size of their bags from the bottom, until they become so large and heavy that the worms let them hang instead of holding them upright as at first."

The silk which forms the foundation of the case is of a dingy pale brown, and is so closely woven as to be almost as firm as parchment, and so strong and tough that it cannot be pulled apart with the fingers. The outside is always ornamented with bits of leaves, twigs or whatever substance is convenient, partly as a disguise.

In spite of their voracity the worms grow quite slowly and do not, attain their full size until the latter part of July or the first of August. During the four molts or changes of skin they cease feeding for two or three days, retiring within and closing up their bags, after first attaching them in some secluded position. When shed the old skin is pushed out through the small end of the bag, which is always left open for the voiding of the frass. The head and thoracic joints of the larva, which are the only parts ever exposed, are of a horny texture and marked in brown and white, as represented in the cut. The part enclosed in the case is of a dingy white color, somewhat bristly and with a faint stripe along each side. There are none of the pro-legs, or false legs, under this part of the body that most caterpillars possess. Until full grown the bag-worms wander but little, and do not leave the tree or shrub on which they were hatched unless the supply of food fails; but as the time arrives for the first transformation they become very active—crawling from branch to branch, not infrequently dropping upon the clothing of the passer-by, or upon animals, by whom they are unknowingly transported to different localities. As Prof. Riley says, "a wise instinct urges them to do this, for did they remain on one tree, they would soon multiply beyond the power of that tree to sustain them, and would in consequence become extinct." The "wise instinct" also teaches them that they have no other means of reaching "fresh fields and pastures new," because the mother insect never acquires wings or any organs of locomotion, and has no choice but to deposit her eggs where she transforms.

After a few days of wandering the worms attach their bags firmly to twigs, never to leaves or leaf-stalks, which might be detached by the winter winds, and securely closing the opening with silk, transform to a brown, shelly chrysalis or pupæ (Fig. 5, *b*), of which that of the male is much smaller than that of the female. Between two and three weeks thereafter the final transformation takes place, the insect reaches its perfect state. The male issues from the bag as an exceedingly active, hairy black moth, with clear wings and feathered antennæ (Fig. 5, *d*). The female, on the contrary, is a mere bag of eggs, without head, legs or wings *(c)*. She wriggles herself out of the pupa shell to the bottom of the bag, where she is sought by the male. After pairing she returns to the chrysalis and fills it full of eggs, intermixed with some fibrous matter, and closes the lower end with the remains of her body. The eggs, thus doubly protected with chrysalis case and bag, have no difficulty in surviving the winter, and from each bag from 150 to over 200 young worms will, under favoring circumstances, escape.

Of natural enemies this insect has very few. Birds do not seem to feed upon the larvæ, nor be able to penetrate the cocoons to extract the eggs. It has, however, three insect parasites which bear the somewhat formidable names of *Catolaccus thyridopterigis, Hemiteles thyridopterigis,* and *Pimpla conquisitor.* The first named of these, a small, dark, four-winged fly, is the most important of the three, destroying quite a considerable portion of the eggs.

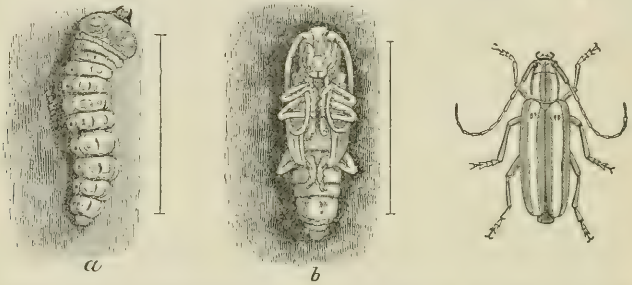
The conspicuousness of the Bag worm, and the wingless condition of the perfect female, render it a comparatively easy task to keep it in check by collecting and burning the bags and their contents during the autumn or winter. On deciduous trees there is no difficulty in securing every one, but on evergreens much more care must be taken that none escape observation. When this preventive measure has not been taken, spraying during June and July will be efficient for the destruction of the caterpillars. For this purpose Paris green is said by those who have tried both to be preferable to London purple for use on both evergreens and deciduous trees.

It has been considered somewhat hazardous to spray evergreens, but Prof. Keffer, Horticulturist of the State Experiment Station at Columbia, claims to have saved choice specimens of Colorado Blue spruce and Irish juniper by two applications of a strong solution of Paris green—one ounce to five gallons of water—and gives it as his experience that the foliage of evergreens will stand a much stronger solution of arsenic than will fruit-tree leaves.

It is strongly urged that during the coming season earnest and persistent effort be made to obtain control of this destructive tree pest, which threatens not only the beauty and thrift of the trees on our lawns and in our parks and orchards, but the safety of all our native evergreens, and many of the most valuable deciduous trees that compose our forests and timber belts.

Apple-tree Borers.—Next to the Apple-root louse, borers are the most insidious enemies of the young orchard. Of these there are six or seven, some of which bore the roots exclusively; others work in the branches or twigs, or just beneath the bark; but the two species most to be dreaded are the ones figured above, which bore more especially in the lower part of the trunk, and the Flat-headed Borer, which works in all parts of the trunk and primary branches.

Fig. 6.



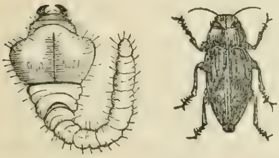
Round-headeded Apple-tree Borer. Parent beetle on the right; *a*, boring larva; *b*, pupa.

The parent beetles appear in the spring and live through the summer, placing their eggs at their convenience on the bark of the trees they affect. This extended period of oviposition necessitates that the trunks of the trees be kept protected either by shields or repellant washes from the first of June until the last of August.

The perfect beetle of the Round-headed species *(Saperda candida)* is very rarely seen after it has emerged from the tree, as it hides during the day, and feeds, flies and lays its eggs only at night. It is a handsome beetle of a cinnamon-brown color above, with two broad, milk-white stripes and silvery-white beneath, and has long, backward-curving antennæ. The eggs are, as a rule, placed within six inches of the ground, each in a little slit cut by the jaws. When the little grub hatches it at once gnaws its way into the sap-wood, where it feeds in one spot, over which the bark will often appear somewhat tightened and blackened, until the approach of cold weather, when it burrows downward, sometimes beneath the surface of the ground, especially in cold climates, and rests until spring. The second summer it feeds upon the sap-wood as before, obstructing circulation and causing the bark to dry and crack. The next year it reaches full size, and gnaws channels in every direction, often cutting its way nearly through the tree, and finally arranging for its exit, when it shall have become a beetle, by cutting a passage upward and outward through the bark, the outer layer of which it does not quite penetrate. It then retires to the heart of the tree, where it has prepared a sort of nest, in which it reposes until spring, when it rapidly passes its transformations, and, some time during May, makes its way out of the tree in its perfect form the third year after the egg was laid. Some of the insects develop every year, so that in a badly infected orchard the grubs may be found in all stages of growth at any time during the summer. This species feeds in the wood of pear, quince, Mountain Ash, and in the native Juneberry, Wild Crab and several varieties of thorn. Orchards planted in forest clearings are especially liable to its attacks.

The Flat-headed Borer (*Chrysobothris femorata*, Fabr.) is also very destructive to the apple, but, unlike the preceding species, is not confined to the pip fruits, but is a very general and pernicious orchard pest, and attacks also certain shade-trees. It belongs to an entirely different group of beetles—the Saw-horned borers—and completes its development within a single year. The beetle is flat, oblong, very hard, varying from three-eighths to one-half inch in length, of a brassy dull greenish color above and coppery beneath, and has short serrate horns or antennæ. The boring grub or larva is easily distinguished from every other borer by the enormously enlarged and flattened fore-part of the body, which is three times the width of the abdominal joints. The beetles delight in the hottest sunshine, and may often be seen at noonday resting on the trunks of fruit-trees, perhaps laying their very minute yellow eggs in the cracks or under scales of the bark. They fly readily, however, and must be approached with great caution if it is desired to observe them at work. The eggs hatch in a few days, and the young larvæ cut their way into the bark and begin feeding on the sap-wood, making broad shallow channels, more or less horizontal, and often completely girdling the tree before they are fullgrown.

Fig. 7.



Flat-headed Apple-tree Borer, Larva and beetle (after Riley).

Recently transplanted trees, and those which are from any cause somewhat weakly, are more liable to attack than those that are growing vigorously, as the young larvæ are often smothered in the sap of the latter. As in the case of the Round-headed species, their presence can be detected by the expulsion of their sawdust-like castings and the exudation of sap, especially on the stone fruits.

The wire screens used by some orchardists to exclude the long-horned beetles from the trunks of the trees do not avail for the saw-horned species; but the repellant washes, if applied to the lower part of the larger branches as well as the trunk, will serve to keep off all species of insects that attack these parts. The most efficient application is made from soft-soap thickened to the consistency of paint by the addition of washing soda, and two applications should be made, one in June and one in July. A thorough coating of white-wash will also deter the beetles from placing their eggs upon the trees. Where the preventive washes have not been used in time, the small borers may be cut out with a knife by tracing them from the spot where the castings are extruded. A bit of curved and pointed wire is sometimes necessary to reach the larger larvæ that have penetrated into the hard wood of the tree.

The Grape-vine Scale *(Aspidiotus uvæ,* Com.*).*—This comparatively new bark-louse is beginning to attract some attention in the vineyards of Missouri and should be recognized and measures taken for its extermination before it becomes a serious pest. It appears upon the vines like a profuse, dingy white scurf, the scales being very closely placed, often overlapping each other upon the older wood—never upon that of less than two years' growth. They are found upon the inner bark during winter, protected by the shreds of the exfoliated bark of the previous season. The effect upon the vine is seen in diminished growth, pale and scanty foliage, irregularity in the ripening of the fruit, which also lacks the usual flavor, and in a generally sickly appearance. Under a large proportion of the scales will be found, early in the spring, from 30 to 40 very minute pale-yellow eggs. From these the young lice begin hatching about the middle of May, and extend their territory by settling on the wood just in advance of that occupied by the parent colony. The individuals do not seem to be active for more than a few days, but as the period of hatching is somewhat prolonged, it will be more than a month before all will have become stationary. While active, they are so small as to be almost invisible to the naked eye, but under a strong lens are seen to be of oblong form and pale orange color, with darker head. The beak is long, but so extremely fine that it requires the powers of a compound microscope to reveal it.

Where the scales have been numerous the effect of the punctures of the young lice are apparent upon the vine very shortly after the insects become fixed. The scales are white and nearly circular, those of the males being somewhat smaller than the female's. The winged males appear in July. They are characterized by a rather slender body of a dull orange color, terminated by a long stylet, and have almost transparent wings. They are not very active, and remain for the most part crawling or flitting about the stems where they emerged.

The spread of this insect from vine to vine is not very rapid, except where the latter are contiguous, and it is probably carried from one vineyard to another by larger insects, such as beetles, bees and wasps, or by birds, which, alighting upon an infested vine when the lice have recently hatched, carry a few away with them upon the feet or feathers, which are unconsciously deposited upon the next vine visited.

The grape-vine scale is parasited by a tiny fly—an undescribed species of *Centrodora,* as determined by Dr. Riley—which is more than usually effective in reducing the numbers of the host insect. It is therefore recommended that the prunings of infested vines, instead of being burned, be deposited in a pile at a safe distance from the vineyard, and suffered to remain there until mid-summer, when the flies emerge.

The most effective application for the removal of the scale is kerosene emulsion, used freely in the spring before the buds put forth. The vines treated should have the loose shreds of bark taken off, so that the insecticide may come in contact with every scale, and thus destroy the vitality of the mother insect or the eggs.

The Horn Fly *(Hæmatobia serrata*, Rob. Des.)—Although the insect here named is only of indirect interest to the horticulturist, it may not be out of place to record here the fact that its invasion, predicted more than once in the writer's annual notes, occurred during the past summer in exceedingly injurious numbers, in various sections of the State. Many letters of inquiry concerning its habits and treatment were received from stockmen during the months of June and July, some of which contained decidedly sensational reports of its effects upon the herds, both of dairy and of fattening cattle. Most of these letters were answered directly, but a few through the "Rural World' the "St. Louis Republic" and one or two other periodicals.

As many of our most distinguished entomologists, including Drs. Riley and Lintner, Profs. Smith of New Jersey and Weed of Mississippi, Mr. Fletcher of Canada and others, have made careful studies of the life history and habits of the insect, there is very little room for original work in these lines, and the account which follows has been in the main compiled from the papers of the authors named.

The fly is a small gray species, in form and structure much like the common house-fly, except that it is less than one-half the size of the latter, and is provided with a lancet-like beak instead of a fleshy-lipped sucker. No figure of it is here given, as in all those prepared the insect has been so highly magnified that the illustration would not greatly aid popular recognition. It was named the "Horn-fly" from a habit it occasionally manifests of clustering about the bases of the horns, but it does no especial harm in this position. On the other side of the Atlantic it is only known to occur in France; but as very few cattle are imported from that country, it is probable that it is to be found in Holland and other neighboring countries, from which we obtain some of our choicest breeds. Once introduced into the United States, the moist climate of our Atlantic seaboard favored its multiplication, and by the time it was recognized as a pernicious intruder, it had obtained such a foothold that extermination was practically impossible.

The first complete account of it that appeared in this country was published in volume 2, of Insect Life, in 1889, and it was discussed in several State reports of the same year. It spread rapidly over the country, especially to the southward and westward, proving particularly injurious to dairy herds, which rapidly fall off in their milk and lose flesh from the effects of its innumerable, irritating pricks, and the almost frenzied activity manifested by the cows in efforts to dislodge it. Individual cows often suffer more than their companions, deep sores being formed on neck and udder, while the fact that the flies rest upon them constantly gives them no respite night or day. It is the perfect insect only that is a blood-sucker. The females lay their eggs upon the fresh droppings of the cattle, and the maggots which hatch almost immediately develop with great rapidity in the moist manure, and when full grown—at that time rather stout and about one-third of an inch long—burrow slightly under-ground to pass their transformations: first, to a dark, oblong pupa, and later to the fly—the latter appearing in about two weeks from the time the egg was laid. The number of generations during a season varies with the temperature and amount of moisture, from five or six to a dozen, the last one passing the winter as pupæ under-ground. Dry seasons are unfavorable to the development of the insect, which will cease to be very annoying after mid-summer.

Prof. Howard E. Weed, of Mississippi, who has had valuable experience in the treatment of this pest, contributed the following on the subject of remedies to the "Rural World" of June 22d, 1893:

> The treatment for the Horn-fly is mostly preventive in its nature, and consists of the application to the cattle of odorous substances which will keep the flies from the animals. For this purpose a great many substances have been recommended, but most of them have proved of but very little value. The following, however, have given the most satisfactory results at our hands:

First—"Gnat oil," made as follows: Crude carbolic acid, 1 ounce; pennyroyal, ½ ounce; sulphur, ¼ pound; crude cotton-seed oil, 1 gallon.

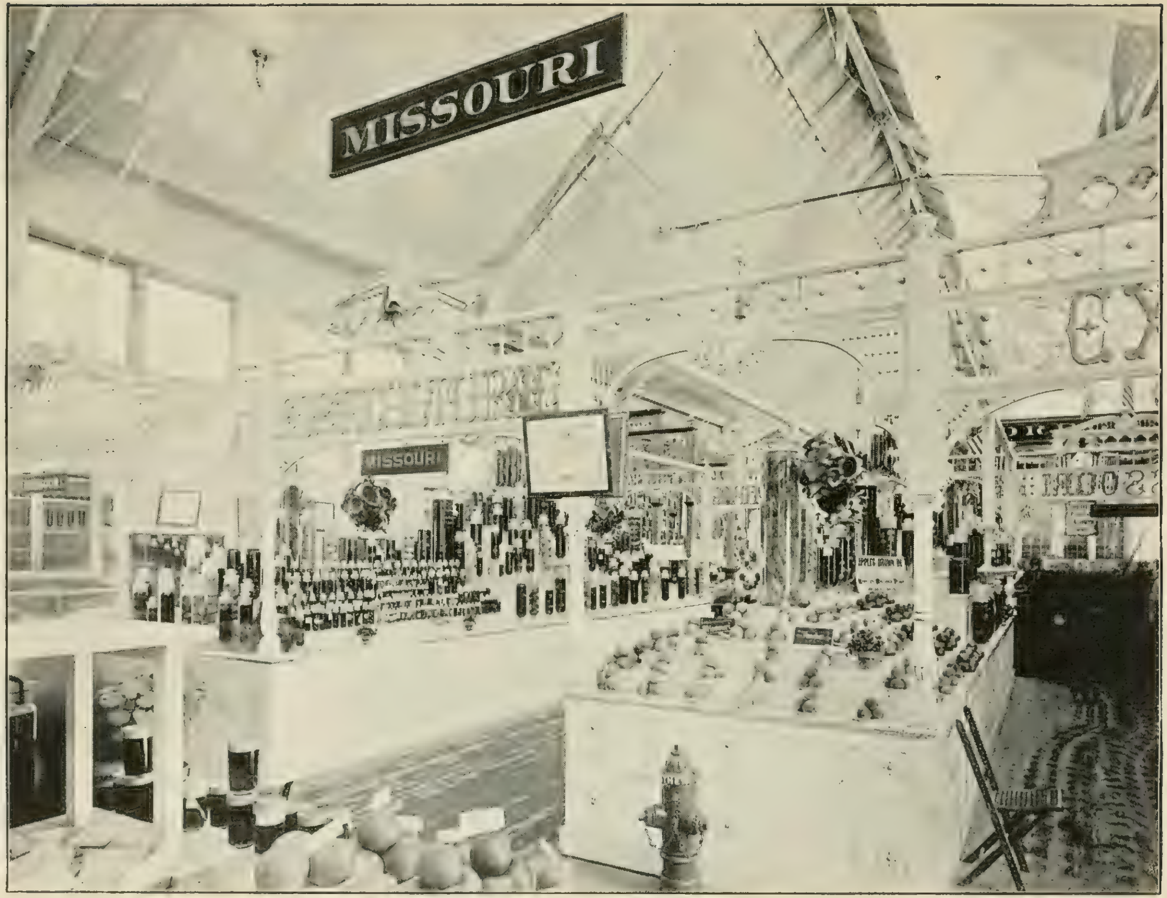
Mix well and apply with a brush or cloth to the back and shoulders of the cattle. The crude-cotton seed oil is cheaper than the other oils, although fish oil or lard oil is equally as good in making the above.

Second—Fish oil and tar mixed and applied as above is equally effective. The tar is mixed with the fish oil so that the odor may last longer and thus keep the flies away from the animals a greater length of time. Either of the above will keep the flies away from the animals for several days, after which the application should be repeated.

Third—The flies breed in fresh manure. It is thus important that the barnyards be kept as clean and free from manure as possible. Lime placed upon the manure will kill the larvæ.

HOWARD EVARTS WEED,
Entomologist.

Agricultural College, Miss., June 15, 1893.



PEACH EXHIBIT AT THE WORLD'S FAIR.

THIRTY-SIXTH ANNUAL MEETING

OF THE MISSOURI STATE HORTICULTURAL SOCIETY, HELD AT FULTON, MO., DECEMBER 6, 7, 8, 1893.

The meeting was held in the opera house.

The Society began to collect early in the morning to prepare the tables and the room for the display of fruits and vegetables. Five large tables were filled with beautiful specimens of fruits, so that any one looking at the fine array of apples made one think of the days when our orchards were filled with beautiful specimens, and it did the eyes good to look upon such a fine array of apples as were here shown.

Besides the exhibit made from Missouri was a fair showing of apples and pears from the far-away land of New Mexico, near Las Cruces, very near the line of Old Mexico, where we hardly thought it possible to grow good apples. Dr. J. M. Bailey had this collection on exhibition, grown by irrigation in the valley of the Rio Grande, 4000 feet above sea level.

L. L. Seiler from Lake Charles, La., had a very fine collection of southern fruits, grown about Lake Charles, of oranges, Japanese persimmons, pears and quinces, besides a large collection of about 25 varieties of sugar cane; also a lot of rice in the sheaf.

Mr. Seiler gave a glowing description of the values of land there as a home and as an investment for farming or fruit-growing.

A collection of apples was sent from St. Joseph; from Exeter, Barry county; from Thayer, Oregon county; from Mammoth Springs, Ark.; from St. Louis, from Kansas City, and a large collection sent from Chicago, from the World's Fair exhibit, making in all a very fine showing indeed of about forty varieties and about four hundred plates.

WEDNESDAY, Dec. 6, 2 p. m.

Society met at the opera house promptly on time, and was called to order by the President, J. C. Evans. All the officers and about 50 delegates from different parts of the State were present, besides a good local attendance of fruit-growers intent on finding some solution to the puzzling questions of the hour.

The President called upon Rev. S. H. Otto to offer the opening prayer of the session, after which the subject of orchards was taken up and the following papers read and discussed:

APPLE CULTURE.

DR. J. W. GREENE, CHILLICOTHE, MO.

In this business the first thing one should do is to make up his mind to be a specialist. Nearly all business must henceforth run in the channel of specialism; and horticulture, in its several branches, as well as the rest.

Apple culture now has too many drawbacks to be successful without special knowledge and special care.

With some general idea as to what this specialty must include, one must examine himself as to whether he has the native requisites and adaptability or not. And if there is any doubt about it, one had better give himself the benefit of the doubt, and go into something he is sure will fit his capacity.

And now, Mr. Jones (a familiar name for our candidate for the apple branch of horticulture), even after you have weighed and measured yourself, as you think, well, and have concluded you are the man for the calling, it would be well to reconsider your case and have yourself tried before a council of your most successful apple-growing neighbors, both friends and foes. Your enemies will be apt to give your case the best analysis, as they have, no doubt, studied your weak points pretty thoroughly.

And, Mr. Jones, to make sure of a thorough trial, and to avoid, maybe, a very grave mistake in life, you would do well to insist that the council select, as a prosecuting attorney against you, its most independent member, to the purpose that the most adverse facts be brought out in the trial, for you should know them all.

Let this attorney question you from head to foot, for you will need a tireless brain and nimble feet to do the puzzling, planning and constant charging against the enemies of apple culture.

Let the prosecution put a few leading questions like the following:

1. Mr. Jones, do you take this step of your own free will and accord, or have you been persuaded into it? If you have been persuaded into it, better take a year to investigate the subject and yourself in relation to it.

If it is of your own option, free from alluring calculations of tree peddlers and other interested parties, then go on to the next question.

2. Mr. Jones, is this a sudden notion you have taken, or have you given the subject timely consideration? If the attack is fresh, let the apple fever run its course a little while, and call the council together, if you still think best, after a whole or partial failure of the apple crop in your neighborhood.

But if you have observed for some time that the apple business has its ups and downs like other industries, you can pass on to the next question.

3. Mr. Jones, are you a man of detail, an observer of little things as they transpire and exist around you, or are you one of casual notice and generalities? If you have been observant and inquisitive enough to learn considerable about the different species and varieties of birds and insects and vegetation that you must see around you constantly, together with their habits, the council will score you several points favorably. They will give you good credit for information already

invested for the business. They will tell you that tree-borers, before they do their harm, are small things to find, and that it takes stooping to conquer them, and that you will need certain kinds of birds to help you.

In fact, Mr. Jones, your council of neighbors will be so well impressed and pleased with you here, that they may take a little impromptu recess to congratulate you for being a close observer in the field of nature, a reader of God's truest and unquestioned word.

Then will come practical question number

4. Mr. Jones, have you noticed any difference between the looks of apple-trees and their fruit of the same varieties in different localities? If you have, they will congratulate you on the probability of dodging a serious blunder that likely most of them have made themselves. And they will advise you to sell your rich, loose prairie land in the open country to some corn-raiser, and buy "thin," white-oak ridge land—even cheap railroad-tie land—and clear it up, blowing out and tearing away the stumps clean, and plant some apple-trees on virgin clay soil. They will invite you out and around to see that such soil will, when well located, produce the hardiest trees, the surest crops, the best colored and best flavored fruit, and the most of it.

By this time the apple council will be curious to hear how much you "already know" about the proposed business, in which you have never had practical experience. And as you eagerly and confidently relate it, you will notice them shrug their shoulders and slyly wink at each other. And by their half-suppressed smiles and broad grins you will measure the amount you will have to unlearn at the start and as you proceed in apple orcharding.

But back onto natural qualifications they will ask you question number

5. Mr. Jones, is your standard of personal industry down to that of the average, general, common farmer? If so, the council will, after all, declare your case "off" at last; for it must be above that in horticulture, where you will have frantic winds, and hiding borers, and possuming curculio, and ingenious caterpillars, and beautiful codling moths, and mysterious fungi, and twig-blight, and leaf-curl, and fruit-scab, and root-rot, and ten times more enemies and drawbacks to watch and fight by midday and moonshine, on week-day and Sunday, from the 1st of January till the 31st of December.

But, Mr. Jones, if you have watched the insects and birds at their vocations, and observed the noxious weeds grow in sunshine and shadow, by night and day, and in wet and in drouth, you have, as before stated, learned useful lessons of industry from Nature's schooling.

But, Mr. Jones, in this examination you have still the worst ordeal to pass; and here the prosecuting attorney will get in his fatal work, I fear.

Question 6. Mr. Jones, are you a man of careless and neglectful habits?

If you plead "guilty" or answer evasively the committee will "rise" and leave "instanter" in disgust and swear their time and pains all lost, and leave you alone to reflect over the certain fact that if every other qualification was good, carelessness and negligence would rule you clear out of every branch of the orchard business.

But if you can sustain "not guilty," they will ballot you into the club and give you advice, in addition to former suggestions, something like the following:

First: Determine what you want to raise an orchard for—for speculation or for the fruit for yourself. I speak of speculation, for I know of no line of agricultural industry that promises greater profits, with more certainty, than raising apple orchards to sell, as such, from five to six years of age, or older.

It is estimated that on an average a healthy apple-tree, after the first season's growth, is worth $1, and that its increase in value after that is $1 a year until it reaches its bearing prime.

I will not undertake to make definite figures, but it is safe to say that if you start right the use of the land for other purposes will go a good way toward paying the expenses of caring for an orchard from the time it is planted until six years old. I say if you start right, because work in the care of an orchard depends very much on the selection of the trees and their planting. I think I may safely say that a first-class orchard at six years old could be readily sold at $5 a tree, throwing the land in, of course, "to boot."

It would sell for this because it would pay the purchaser on an average of from 25 to 100 per cent on the investment for 10 years to come, and then a fair per cent for a few years more. But if you have to cut this calculation in two in the middle, the speculation would even then be a good one.

In raising an orchard for sale you will get cheap land, near some railroad station if possible, and plant advanced trees of early-bearing varieties. Persons buying orchards are apt to want those just coming into bearing, and with as many trees to the acre as can well be, never less than 100. It is immediate fruit and lots of it that they want.

Then, do you want an orchard for feeding stock, or for home and shipping markets? I would not be surprised to see the biggest apple "boom" yet to come to the sweet apple, at no distant day, for hog-feed. I am not advised as to what experiments the State stations have made, but I have put myself to some pains to get expressions from practical farmers, and they invariably agree that the sweet apple is a valuable feed for hogs; and some speak from experience.

I will here give an instance: A farmer whom a tree peddler had "swindled" into a sweet-apple orchard (by giving him but one variety instead of 10 that he had ordered), assured me that if he were going to plant 100 acres he would plant all sweet apples, feed them to his swine, and buy his family fruit from his neighbors, who had "more time to monkey with picking and assorting." He said he didn't care for worms in apples for hog feed.

He assured me further that by the test of weighing some hogs "on and off" he actually realized 30 to 40 cents a bushel for his apples, and that too without the work and worry of picking and the loss in assorting—as he shook them off of the trees—and without the expense of hauling them to market. Of course for this purpose, as well as for market, one would want summer, autumn and winter sweets; and those for winter would have to be put into cellars and fed therefrom. But caves and cellars suitable to the use could be made at small expense.

If you want to raise apples for market, of course, the varieties must depend on the market.

And, Mr. Jones, there is no more important point to be considered in the whole enterprise of horticulture than the one of market. In this the apple-raiser has the advantage over most other fruit-growers. Even though he lives away inland, he can prepare to store his fruit until a convenient time for selling it, even to "wintering it over" in cold storage of his own cheap construction.

And, Mr. Jones, as the subject of varieties is sufficient for a good lecture of itself, I will only raise it just now, leave its details to others, and merely refer to it in a general way. But if you are going into the business to sufficient extent to justify you in shipping your own fruit, instead of selling it to others to ship, you must see to it that you have a regular and reliable succession of ripening, from the earliest that will do to ship at all, to the latest keepers in your home-made cold storage—I may say from the Early Harvest and Red Astrachan to the Willow Twig and Little Romanite.

You will want, then, to build up a trade of your own, and to hold your customers you must be able to supply them yourself from the first to the last of the apple season.

It might, however, be well to impress you that variety must depend on climate and locality, even as much as on the market. And, further, you must understand in a general way that the best apples are by no means always the most profitable. For profit you will want to plant every year bearing kinds, and such of them as mature the best colored fruit, freest from worms and scab.

Still, Mr. Jones, if you are going into the business somewhat extensively, you can afford to plant some of the best varieties and build up a market also for your fancy brands—like the Huntsman's Favorite and the White Winter Pearmain and some other dessert sorts.

If, however, you expect to raise apples as most of your neighbors do, and to dispose of in their market, you can learn best from them what has been the most profitable variety. Then, again, if you wish to grow apples for pleasure as well as profit, you can appropriately plant of many varieties of the new kinds that the nurseries are pushing at high prices. And you can furthermore originate also some yourself, and call one "Jones' Highfalootin."

When you have decided as to variety, you will get them from the nearest nursery that you deem reliable; and if your tree man begins to talk "whole root" to you, give him a nod and wink and cry "chestnuts" at him, from the northwest corner of your mouth.

And here is my reason for this advice: Four years ago I had a reliable nurseryman put me up 100 whole-root grafts to test the matter myself. With a sharpened hoe-handle I made good holes, and planted them deep; with so much root to start on they made extra yearlings, when I transplanted most of them; but with so much root of the French crab-seedling, they failed to make proper ones from the graft scion, and now I have a lot of practically dwarf apple trees.

I once gave my opinion from theory in favor of whole-root grafts, and now I take it all back, after, to me, satisfactory experience.

If your nurseryman talks "crown-graft" or "budded stock" to you, tell him you don't care a continental how the trees were made, you want first-class root from the graft scion itself, or something known to be more vigorous.

Unless you have the utmost confidence in your nurseryman, take one or two of your successful apple-raising neighbors along with you, and if necessary pay double price for strictly choice trees with first-class roots running out equally on all sides. See that every tree is a center stem one, with limbs (if old enough to have limbs) branching out on all sides like a typical spruce or cedar tree. Give your nurseryman to understand about the examination and trial you have gone through, and he will readily lay his forked, crotched, scabby, stunted and wormy trees aside for some honest greenhorn, at cheap prices.

Whether a tree is a yearling without a limb, or a five-year-old ready to bear, let the center stem be big at the bottom and tapering up to a small top, like a buggy whip, only still more so.

Whether you plant yearlings or five-year-old, they will all be about the same size six or seven years after planting, with the chances in favor of the younger trees being the most firmly rooted. But up to that time the older trees will have paid decidedly the best.

It does, however, take more time to handle and plant, and more care to watch the older trees and start them to growing. They must have extra care in planting, good feeding, good mulching and wrapping, and if necessary watering, during the first summer. The watering is best done by making a few small stake-holes around the tree, and filling them with water often enough to insure the needed moisture to keep up a healthy flow of sap during hot weather.

Then in planting the larger trees, especially the five-year-old, there should be two or three pounds of ground bones, "bone-meal," mixed through the dirt, particularly toward and about the ends of the roots. This has a wonderful effect. Hundreds of new rootlets will soon start out and make a cluster-mat, like oleander roots in a tub, giving the tree bracing strength as well as feeding power.

Bone-meal has such powerful effect as a fertilizer, that it will straighten a leaning tree if dug plentifully in about the roots on the obtuse side. And if the bone-meal is partly dissolved ready for root food, so much the better.

I once heard my instructor tell an old lady that he straightened his trees by cutting a dog in two, and burying half of him on the side from which the tree leaned, when she asked him whether he killed the dog.

As to planting advanced trees, I may give you a little of my own experience: Three years ago I planted three dozen of five-year-old, in way of replant, in an old orchard that I intended to cut down. During the first year I got but little growth, even with all my pains, not having used the needed bone dust as a starter. But the second year some of my trees made a growth of four feet, and this year they were quite full of bloom. And I would have had quite a crop of apples from them if the good Lord had not seen fit to put me where I might console other miserable company. As with young stock, you can afford to sit up of nights and work on Sunday to give your young trees a good start.

But take your own trees, small or large, as may suit your own purpose, home, seeing that the roots neither get dry nor frozen. If you can plant them within a day or two, throw them into your pond with a weight on them to keep them under water, both root and top.

But if they are to lie over a few days, heel them in deeply, wet the roots occasionally and keep the sun off the tops. At any rate, never plant a tree that is at all withered without first soaking it from twelve to twenty-four hours in water.

If you have to keep trees, especially large ones, over winter, bury them, root and branch, underground out in an open place where mice don't care to go, using nothing but dirt to cover them. But better plant large trees in the fall if possible, that the soil may settle well against the roots before budding time. And for winter protection pile the dirt as high up around the tree as you well can.

In laying out your orchard the rows should run up and down the hill as nearly as possible to secure good drainage, for an apple-tree will not live well with "wet feet." No doubt it would pay well to tile-drain any orchard, but to save the advance outlay we will improvise a cheap, practical substitute.

For every row we will plow out a kind of "land furrow," making a ditch as deep as a good, strong team can throw it out; then in the bottom of that run a subsoiler; then with the plow throw the dirt all back again and harrow it off thoroughly until the ground is mellow. You will then have a slight ridge, such, at least, until the ground settles again. Now, on this elevation, and right over the hidden drain, throw out the dirt until a hole is made wide enough to take in the roots of the tree stretched out straight and at full length, and deep enough to set it at least two inches deeper than it stood in the nursery.

In planting your trees, especially if large ones, you will want at least three careful men—one to wash the roots and lower part of the body off clean and examine for borers and to carry the trees, only as fast as needed, to the planters; then one to hold the tree and churn it briskly and in earnest while number three rakes in loose, mellow soil and works it in under the roots with his hands, mixing in with it some well-rotted barn-yard manure or other non-heating fertilizer.

If the ground is very dry, some water should be thrown in after the roots are all covered and before the hole is finally filled with a shovel and the tramping done to steady the newly-planted tree. Some use the "loblolly" method, but whatever the plan, the idea is to get dirt packed closely about the roots, large and small.

It will be also the washer and wormer's duty to cut the broken and battered roots off smoothly with a sharp knife, beveling from the under side. And it will further be his duty to wrap the tree with a strip of white muslin, to prevent the borer fly from laying her eggs in the bark and to keep the sun off the unshaded body the first year, and it is best to do this wrapping before planting.

The object of the aforesaid ditch is three-fold: First, to furnish escape for surface water in hot weather; second, to provide moisture to the roots in dry weather, and third, to give depth of loose ground for new tap-roots or anchor roots, to take hold readily and deeply; and to encourage this latter, a good double-handful of ground bones should be put at the bottom of the hole.

The distance you plant your trees apart will depend some on the habit of the variety, but in Missouri the average should not be over 25 feet. At first I planted 33 feet, then 30, then 25, and lastly 21 feet. And the most certain and most profitable orchard within my knowledge contains 160 trees to the acre—only about one rod apart. With a view to economy and longevity, you might plant alternately of long and short-lived varieties, and cut the latter out in due time. For the long-time orchard you might plant Northern Spy. But here, again, something depends on the soil as well as the variety of fruit. Trees may be planted much nearer on thin oak ridge land than on rich prairie or bottom soil. But one thing is certain, and I think settled in this country, and that is, good fruit must be raised mostly on young trees. By the time trees meet at even 21 feet apart, they have done their best service, if not the most of it. Better have the good apples from four young trees than the poor ones from one old tree. And that is the way you may safely figure the matter.

In order that your trees may be the same distance apart in all directions, they should be planted in triangles instead of squares. This is done by alternating or "zigzaging" two rows together. For instance, you wish to have your trees 21 feet apart in every direction, you will plow your ditches and make your rows 18 feet apart, and then plant your trees 21 feet apart in the row. In your first row plant the first tree at the end, and in the second row begin 10½ feet from the end, and so on.

If you plant trees over three years old, you should reduce the top by cutting back at least one-half of last year's growth, and in doing so use a sharp knife and bevel from the under side, near a good, vigorous bud, that the wound may heal over perfectly and in the shortest time. Now don't regard this as an unimportant matter and neglect it.

But don't cut off many of the larger limbs the first year, or you may have blood-poison. And if you do cut off any such, be sure to wax the wounds over well at the time of cutting. But much better to leave the cutting of the larger limbs until the second year, when the cut will heal over more promptly. But in any case, keep in mind the center stem and avoid making or permitting forks.

There is a difference of opinion as to how high apple-trees should head, but this is largely a matter of convenience in cultivating, as nobody now-a-days wants them very high. Pious people will want the limbs higher from the ground than those who don't mind a little profanity. But in this the habit of the variety must be taken into consideration again. The kinds that spread must have their first limbs higher than those of upright growth.

In the Ben Davis, Willow Twig, Jonathan and Maiden Blush—the leading varieties raised in North Missouri—the first limbs should be about three feet from the ground. That will admit as close plowing as a tree should have, if orchard harness is used, and the fruit will be nearly or quite to the ground when the tree gets to bearing prime.

But it is not necessary that the limbs should all be cut off that high up at the start. Some good orchardists encourage limbs very low down for the first few years, clipping them back to within about a foot of the center stem, then cutting the lower ones from year to year close to the tree as the top expands to cover the body. It is claimed for this method that the limbs encourage a healthy, stocky growth of the lower part of the body. In one of the healthiest orchards I have ever seen, the bodies of the trees were hidden with short, shaggy, matted limbs clear to the ground. And I will add here that not a tree in the ten acres had ever been pruned, except to clip the ends of limbs to make the top balance, and to cut out dead and broken branches.

After your trees spread so you cannot get close enough to them, in cultivating with a horse, you can use a small donkey for the purpose. Such an animal is quite strong enough, for you must bear in mind that it will not do to plow deep enough to disturb the roots of a fruit-tree of any kind. Besides, even every jackass in the country should be made to earn his living.

The pruning needed in an apple orchard should be done before the trees are five years old from planting, and that should be done in way of training, rather than pruning in the common sense of the word.

The orchardist should have definitely in his mind just how he wants his tree to be when grown, and so construct it by cutting off and out all limbs, when very small, where he does not want them; also by encouraging others to come and grow where he does want them. And the grower of a small orchard may, for pride's sake, bud and graft limbs in, when Nature does not produce them according to his fancy.

Theae are, of course, some varieties of apple trees you will have to prune more than others, and some few where you can not produce center stem trees—the Willow Twig for instance. But still you can train it so as to avoid forks that will cause the tree to split when it comes into fruiting.

And right here, before I forget it, Mr. Jones, let me whisper to you one of the secrets of successful orchard-growing, a profound secret it is, too. But as it is one of the tricks of the trade, you must have it. It is this: We kill, on the spot, all professional tree-pruners who come around planning against our orchards, either through ignorance or for the paltry dollar. We kill 'em, and this is the reason they are not so plenty as they used to be.

We can stand borers and blight, fungi and sun-scald, but professional tree-pruners, never! *Never!*

They were the greatest enemies to apple-culture and we had to kill them off, and what became of them after that God Almighty in his mercy only knows.

But, Mr. Jones, there are a few of the breed left yet, and before you can be raised to the highest degree of the craft, you will have to prove to the fraternity that you have killed at least one.

In addition to the necessity of protecting young apple-trees from the hot sun in dry weather, you must in some way secure them against borers in summer and rabbits and mice in winter. I have tried but two of the usual methods in use. I have wrapped with white muslin and with the lately invented wood wraps. The former will succeed, if properly applied and persisted in until the tree is six or eight years old, but only by vigilance. The cloth must be thin, and closely put on clear down to the roots, and tied with a very narrow strip of the same material that will rot and break, if necessary, as the tree grows too large for its clothing; and the wrapping should be changed at least once in two years—better every year, and a search made for borers, for there may have been eggs in the bark before the first wrapping.

The new wood wraps have not been a complete success with me. They have kept the rabbits off, but not all the borers out by any means. Then in case of fire they are even worse than cloth. While I have had no experience with the wire cloth protectors, I am forcibly impressed with their seeming perfection for the purpose. They are more costly at the start, but no doubt as cheap as anything in the outcome.

In cultivating your apple-trees you may raise corn in it for a very few years, providing you don't plant it too near the trees, and will cut it up and haul it out early in the winter, and by no means make a shock around a tree. But you must never raise any kind of small grain at any time, nor grass, among young trees, lest grasshoppers be raised or induced to come and strip them. And two consecutive years of grasshoppers are equal to one fire. Better raise root crops and vegetables, or give your orchard clean cultivation without anything else than the trees. The cultivation should be frequent, but only deep enough to kill the weeds and grass.

When your trees are seven or eight years old from planting, you may sow your ground in clover, cutting it as often as need be with a mowing machine and letting it rot on the ground. And for this purpose you will find a one-horse machine almost indispensable.

And now, Mr. Jones, this paper will constitute your first lecture. When you learn it well you can be initiated. When you have heard and learned a half dozen more, and have had five years' experience and killed at least one professional apple-tree pruner, you can be admitted into the highest degree of the sublime order of the W. A. G. S. (Western Apple Growers' Association).

THE ORCHARD—DISTANCE TO PLANT AND VARIETIES.

ROBERT E. BAILEY, FULTON MO.

It is characteristic of the age that nothing is regarded as settled. This is true in regard to the distance apart trees in orchards should be planted as well as other things. Some growers plant trees as far as 40 feet apart each way; others as close as 15 feet each way. The tendency among commercial growers seems to be toward thick planting, with a view to thinning when the trees begin to crowd each other. I planted my first orchard some 12 or 13 years ago 20 feet apart each way, half apple trees and half peach. The hard winters of '82 '86, thinned out the peach-trees before I harvested a crop, leaving the-apple trees a little more than 28 feet apart each way, and the rows diagonal across the field. This I do not like.

It makes cultivation inconvenient, and leaves the south side of the trunk of the tree exposed to the sun in the hottest part of the day.

In 1884 I planted apple-trees 20 feet apart each way. These trees have now made 10 years' growth. The branches almost meet, and yet they have not given me a full crop. They bore few apples in 1890, less in 1891, and none at all in 1892 and 1893. The last two years, as you know, were seasons of general failure in the State. They now need thinning, but as they have not borne a paying crop, I will leave them a year or two longer.

When I planted these trees, I intended to thin by cutting each alternate tree in every row, leaving it just as that part of the orchard where the peach-trees were killed; but with my present light, I think it would be better to remove each alternate north and south row, leaving the trees for permanent orchard 20×40 feet. Our friend Hartzell would probably think them still too thick.

My last planting, done two years ago, was 15×30 feet. The trees were all apples, but varieties were alternated, giving opportunity to remove the least profitable. When these are thinned, they will remain 30×30 feet. I believe it would be better to have the trees closer in the rows running north and south.

Mr. Wellhouse, of Kansas, plants 12×32 feet. I don't know that he has thinned or that he intends to do so. If not, I think his trees too close. Perhaps you have seen an item in the horticultural papers about a man in Canada, who sold $800 worth of apples from 15 Fameuse trees, which occupied one whole acre.

Could we make the Ben Davis grow to such a size, and live long by such thin planting?

I believe I will make my next planting so as to have the permanent trees stand 24×40 feet, making about 44 trees per acre, and plant another row of quick-bearing varieties half way between the permanent rows. How would Keiffer pears promise for this temporary row? Would they be as likely to prove profitable as Ben Davis apples?

As to varieties, the last two years of almost total failure in this part of the State have given us no new light. All kinds failed to a great extent. In a few places there were some Maiden Blush and Rawles' Janet. It is safe to say that the Ben Davis is still the leading variety for profit, with Jonathan, Willow, Clayton, Minkler and York Imperial for second choice.

MY SUCCESS WITH A YOUNG ORCHARD.

D. S. HELVERN, MAM. SPRINGS, ARK.

A little over a year ago I traded a Nebraska farm for a farm in Fulton county, Arkansas, of 240 acres, with 40 acres partly cleared and in cultivation. On this there were 100 fruit trees of apple, peach, pear, plum, cherry and apricots, also some grapes and berries. I moved onto the farm in January, '93, and began clearing up and preparing the ground for my orchard, etc. I ordered 1000 apple trees of three varieties: namely, Mammoth Black Twig, Minkler and Ben Davis. These were for a commercial orchard. I also ordered 100 Keiffer pear, 25 Transcendent crab, 50 Wild Goose plum, some quince, cherry, etc., which were all put out in good season as follows: I set my trees in rows 18×22 feet apart; began preparing the ground by starting a land on the east side of the field 22 feet wide, so the center furrow—or dead furrow—would come just where I wanted the trees to stand. I run my plow about five or six inches deep in the start, and kept getting deeper until the last furrows were nearly a foot deep. Then I used a bull-tongue to cross out, 18 feet apart, began on the south side, and so on until the whole field was thus crossed. Then all I had to do was to use a spade or round-pointed shovel and throw out the loose dirt at each cross furrow, and set in the trees. I used all one-year-old trees, first-class in every particular, headed them at 15 inches from the ground. They were set on a northeast slope, most of the land very rocky. Out of the 1000 trees I think just one tree failed to grow.

I cultivated the ground in corn, kept it clean of weeds and grass until September, then I sowed a few turnip seed through the orchard, which came up and are now growing nicely. I will leave these grow all winter to feed the rabbits on in place of feeding on my young trees. I also wash my trees withw hite-washand carbolic acid. They have made a fine growth; some are now five feet from where I headed them, and as fine a head as one would wish to look at. My pears especially have made a reasonable growth, and not a pear to die.

Now I want to ask, is it best to cut back any of last year's growth, on apple, pear or plum? I understand the other all right.

TREE GROWTH.

J. C. BENDER, ST. JOSEPH, MO.

The sap of plants and trees circulates down, and never from the roots up.

Grafting and budding should be on stocks of same or similar kind, so sap can circulate freely.

Soil, fertile lands, develop, grow as organs, is alive and is made by plants, trees, etc., even giving color to the soil. Walnut makes black lands; whitewood and peach, light-colored lands.

The seed of any tree, fruit or other product will produce its kind if the flower is not fertilized by a different tree; fertilization only goes to the seed and does not affect any other part of the tree. The continuous budding and grafting in connection with the deterioration of the land is like in-and-in breeding, and will finally destroy our orchards. The injury of in-and-in breeding is not the near of kin but the transmission of impaired vitality; a near of kin implies similar characteristics of weakness which are transmitted: that is, where the ancestors have a similar weakness, the offspring will have it to an increasing extent; if the weakness in ancestors is not similar, not in same organs, such weakness is often cured or lessened in offspring; this applies to the vegetable world as well as the animal kingdom.

We must endeavor to get the coming orchard from the seed, and no transplanting; a tap-root once destroyed never grows again; a root or limb after one year's growth seldom if ever heals over.

The younger the trees are set out, the healthier the trees. Go north for your fruit trees, never south; take the tree up with all roots, no trimming, thick enough to at once shade the ground if you can.

The best fertilizers are their own leaves; straw or any rocks always on the surface, and some grass of the clover family that remains green all the time, so the sun and wind can never get at the bare land.

The summer sun must never strike the body of the tree. If the grass or weeds get too high, cut them down and leave for mulch; bring your orchard to the condition of the primeval forest. If trimmed, do it in June when sap is in full circulation; the sap is again in circulation in August.

Trim off this year's growth; the advantage in trimming off new growth is, it will heal over and hasten the bearing. It is believed now that the Japanese produce their dwarfs by constant trimming at the right time of growth, before the wood is formed. Best results come from trees where limbs start from the tree at the ground, at an angle not less than 45°, and this angle they keep, if set thick; after they crowd and interfere with their bearing, thin out.

By leaving the stumps in the ground, to gradually decay, it keeps the land loose and adds the best tree fertilizer to the soil. A water sprout or limb in a tree often indicates an impairment somewhere in the tree, perhaps near where the sprout starts; above this is always the most vigorous limb of the tree and carries the sap where needed; the leaves, the green bark and numerous large leaves show health.

All that goes to make a plant, a tree, enters as a gas, a prepared atmosphere, never as a fluid. I doubt if a tree feeds from any pores on top of a leaf, always from the under side of a leaf; see the glaze on top of leaf, and the open pores on the under side of a leaf.

Rotation of crops is not required, either to enrich the soil or to improve the crops or fruit; if we assist the plants, let them have the room they want, and keep out that which intrudes or crowds or impoverishes the land: plants will do the rest, and the more plants the richer the land, and every succeeding crop will be an improvement on its predecessor.

The sooner after maturity a seed gets into the soil, the more vigorous the growth; this can not always be done, then we must keep the seed in some moist, cool condition, in which found at maturity. If wheat, oats, beans be left in the straw until needed, same with corn, it is better. All the moisture that goes out of a seed after maturity is that much life.

Nuts must remain in the damp hull till planted.

I submit the following letter:

LOGAN, UTAH, Nov. 23, 1893.

JOHN C. BENDER, Esq., St. Joseph, Mo.:

DEAR SIR—The Missouri reports, which I before named for you, will give the information for which you ask. The amount of material that a plant draws from the atmosphere, directly or indirectly, through its leaves in the form of carbonic acid, etc., amounts to 95 per cent as a general average, sometimes as high as 99 and as low as 91. The soil and the atmosphere furnish all the essentials of plant growth, except nitrogen, phosphoric acid and potash, and often one or two of these in great abundance. Probably it is not essential to furnish more than 1 to 3 per cent of the weight of plants in the form of plant food.

Very respectfully,
J. W. SANBORN,
Director.

ABOUT PROTECTING FRUIT TREES.

For the last six years I have been growing an apple orchard, putting out about 500 trees each year, and I have given the protection of the body of the trees special attention. I began by using wire cloth. This was rolled about a round stick until it was a cylinder about two inches in diameter. This was a slow and unsatisfactory process, and so I invented a simple machine for curling the wires into cylinders, by means of which the labor was reduced to a minimum, whereby the trees could be well wired and that very rapidly. The wire cloth I kept on the year round, and so long as it lasted it was a perfect protection. It served many purposes. It kept the body shaded and free from scald. It kept off rabbits. It kept off the fly that lays the borer eggs, which are more destructive than rabbits. Also it protected the body of the tree well from bruises and cuts in cultivating and plowing the land.

My experience is that it is necessary to have an all-the-year-round protector. This summer I allowed 400 trees planted this spring to go without wiring. This fall I found 15 choice trees ruined by rabbits and 20 trees stung by the borer-fly.

While I had found a perfect protector, which would spring out as the tree enlarged, yet I found it somewhat expensive in original cost, and also that it rusted out very soon. The wire, 1×2 feet, cost about 3 cents each tree, and many would rust out in one year and nearly all in two years. So I resorted to painting the wire. I saturated and heavily coated the wire cloth with iron-clad paint, which brought the cost of the wire up to about 4½ cents for each tree, but which once put around the tree would last, as near as I can now judge, from three to five years.

The medium height for the body of an apple-tree is from 30 inches to three feet. This allows the wire to be raised up about one foot from the ground, so that the lower part of the body can be readily examined for borers, which should be done at least twice each year, preferably in May and October. The wire can also be slipped entirely off the tree and the whole body examined, and then it can be easily replaced by springing it back around the tree. I have these wires on about 2000 trees, and on many of them I have kept them on for five years, and find them an absolutely perfect protection, not only from rabbits, but borers, sun-scald and knocks and bruises in cultivation. I only use the wire two feet or 26 inches high. But for expense, 28 or 30 inches would be better.

The objections to the methods named by Professor Georgeson are that any process of protection which has to be done every fall is almost always neglected, as it involves a large amount of work and is all undone in the spring; and I find also that summer protection is quite as valuable, on account of the harmful influences I have already named as being overcome, as is winter protection against rabbits.

To avoid the expense of wire, I am now trying a new experiment on 400 trees which I shall know more about when fully tested. I take gunny-sack cloth, also known as burlap, and cut it into strips one foot wide by 28 inches long. These strips are then tacked along one edge to a narrow strip of wood about the size of a lath, also 28 inches long.

These are taken to the orchard, the stick set up against the tree and the gunny cloth wrapped around the tree and the other edge tacked to the stick. This takes about five tacks each time. These protectors cost, exclusive of labor, about 1¼ cents each. They serve all the purpose of the wire, can be raised up so that the lower six inches of the tree can be examined for borers, protect the tree from bruises and sun-scald, and the only uncertain point is their durability. I think they will last from two to three years. As any kind of old cloth can be used for this, I hope it is a valuable invention. I recommed it, however, with caution, as I have become very suspicious of new experiments.

I would also suggest the extreme importance of examining trees carefully for borers in May when planted, which are in the trees from eggs laid in the nursery during the previous season. It is on account of borers already in the trees that it is most important to have a protector which can be easily removed. If the protectors I have suggested are kept on the trees from the time of planting, they will rarely ever have a borer in them unless they came with the trees from the nursery row. While the trees are properly wrapped with wire or gunny-cloth, the fly cannot get to the body of the tree to deposit its eggs. It will not go down from the top into the wrapper for this purpose, and they rarely sting over six or eight inches above the ground.

Some of the methods of protecting trees proposed involve too much labor, and must be done too often. If a farmer has a few acres only, any plan is good enough. If the labor is hired, as in a commercial orchard, the labor expense must be considered along with the material expense. The two methods I propose, lasting as they do from two to five years, give an all-the-year-round wrapping which permits an examination of the trees at the least possible outlay of labor. One man will curl and set 500 wires in a day. One man and a boy will cut, tack and set 250 gunny-cloth guards in a day.

HOMER REED.

Kansas City, Mo.

OVER-PRODUCTION OF FRUIT.

In the general discussion at the winter meeting of the Missouri State Horticultural Society, one speaker took occasion to say: "Judging from the past, have not the American people run everything into the ground that they ever undertook? Look at poultry. At one time a new breed of chickens would make a man a fortune. Then hogs and hops turned the mind of the people. Then people went wild in the cattle boom. Men came from England and Scotland and invested vast amounts in cattle. I told them the thing would be overdone. They talked just as we now talk about apples, and said it could not be overdone. I presume that 100,000 acres have been planted to apples in the last three years in Southern Illinois, Missouri and Arkansas. It seems to me that it must make them a drug on the market. A few years ago Kansas came to Missouri for her supply. In a year or two there will be no room for Missouri apples in Kansas. In Denver I saw the most beautiful fruit grown in Colorado without irrigation. They will supply their own markets and those contiguous. We must look this business in the face. I believe the business will fail and then become a success to some after many have left it."

Another gentleman facetiously remarked that there was one thing they had not run into the ground far enough, and that was the plow.

Secretary L. A. Goodman summed up the subject of over-production in the following words: "The question of over-production may just as well be examined carefully and honestly. There is no question but that so many millions of trees have been planted that there will be portions of our country where it will not pay to gather them. There is danger of over doing this matter unless we can get the help of our transportation companies. If they will move our fruit as cheaply as they do our wheat or corn or lumber, we can fill our market full of fruit at all times at reasonable prices, even cheap prices; and when we can do this we will see the demand so increased that we cannot supply it. You may be sure that we can sell 100 barrels of apples to the consumers for $1.50 per barrel where we can only sell one for $4.50 per barrel. If we can give them plenty of good fruit at low prices they will use all we can grow."

DISCUSSION.

S. W. Gilbert finds no trouble with borers in his country.

A. Nelson—Does not care about whole root. In fact, uses only about one inch of root, so that the tree will send out roots above the graft.

Prof. C. A. Keffer—The purpose of the root is to make the graft grow, and the sooner it gets on its own root, the better.

Mr. Kessler—The theory of the whole root is that the small end of the root has not enough vitality to give a good, healthy growth, and it produces only lateral roots, whereas the crown graft, with a piece of root eight inches long, will produce both tap and lateral roots, which are necessary to the best development of the tree.

Question—Does not the tree you hold in your hand answer the question of a good tree?

Kessler—No. Here we have only lateral roots, and no tap-root. I want to find the best way, and am looking for the truth.

Question—Does the Ben Davis ever grow a tap-root?

President Evans—No, never. I never yet saw an apple-tree of over 10 years of age that had a tap-root, and I have pulled up hundreds of them at 20 years, but not one of them had a tap-root.

I think the best tree is the one which is on its own root. We plant varieties that bear young and they bear their all within 20 years.

J. C. Bender—Have not our trees deteriorated by continual propagation? Had we better not go back and produce new trees? Apple and all trees get 95 % of their substance out of the air, and every tree will produce fertility enough for itself. In fact, I think, as I say in my paper, that the tree makes the soil and not the soil the tree. When a tree begins to fail it will over-bear.

One thing impoverishes the soil, exposure to sun and air and rain. Fertile virgin soil holds the most moisture and holds it longest. The circulation of the sap is only downward. If not, then when we graft an apple the fruit would be spoiled.

(The above statements were objected to by many members and exceptions taken to the assertions.)

A. Nelson—What we want is results, and we want them quickly, too. If I can take a one-year tree and plant it in orchard and grow it six years and then get $100 per acre for the fruit, I am satisfied, and that is what we are doing up our way.

Mr. Evans—A *whole-root* tree can be grown, but is not practicable. We can make more money to grow quickly, and when they are past their best take them out.

Question—Does an apple-tree have a tap-root after it becomes of age?

Secretary—No, the apple-tree begins to lose its tap-root at once after the first year's growth from the seed. You may plant an apple-seed and the first year the root is one straight root. The second year the tap-root grows very little deeper, but sends out side-roots in abundance, and the next year more so; so that at the end of the third year the apple-seedling (never moved) has very little deeper root than the first year. As the tree grows older we find stronger side-roots to correspond with the large spreading branches of the top, but the tap-root gradually losing itself in the stronger growth of the side-roots.

This whole subject of longer-lived trees grown on whole roots can only be answered by testing for a long number of years *absolutely* whole roots, the seed planted where it is to remain, and then watched closely. We have no reason whatever to believe that a whole lot of promiscuous seedlings, grown from a lot of seed, washed out of pumice where cider is made, are or can possibly be longer-lived or hardier than our best varieties on their own root.

In fact, I believe, that there are two causes that have tended to shorten the lives of our trees, *very much* more potent than any that this discussion tends to prove. I think that the blame for our short-lived trees, if any such, lies in two different directions not touched upon: The first is, the great mistake made in the indiscriminate use of all kinds of seed, taken from where? Why, taken from the poorest, scrawniest, gnarliest, unripened, smallest apples we have in our orchards. This has been going on for years, until all of our orchards, *perhaps*, are tainted with this weakness.

We used to grow seedlings from the best of specimens, well ripened and perfect. These seedlings were compelled to go through about four years' tests of winter's cold and summer heat, before they were top-grafted, and only the best survived this ordeal

This was an altogether different method from that of today, where *every root*, one year old, is used for a graft, no matter what its parentage, its size, quality or hardiness. What are our best varieties but selections from our best seedlings?

Another, and the second item to enter into this cause of short-lived trees that we hear so much about, is the using of all kinds of scions, never considering the health of the tree or its growth, or any other fact but that you have a good length of scion. In fact, I have seen some go so far as to cut all the scions off a tree every year, and keep the trees, for scions and nothing else. Then, scions have been gathered from all kinds and sorts and conditions of trees all over our country.

It is a sure fact that the failure of trees is due to this cause as much, or more, perhaps, than to the manner of grafting, and the kind of root used, however objectionable that may be.

On these two principles hang all the law and prophets of healthy tree growth:

1. Good, hardy, selected, healthy roots which have gone through the tests of winter's cold and summer heat for four years; and,

2. Good, sound, perfect, healthy scions from sound, healthy, good, bearing trees.

If these two laws are complied with, it will not take long to decide this matter of whole root or piece root, and surely it would make our trees longer-lived if we would follow the above rules. It is worth the attention of our experiment stations, at least.

One other fact we find in our orchards that has been overlooked, I think, and that is a *root-blight.* This seems to be due to a fungus, just as much as the pear-blight. The cause of this root-blight, and the remedy have not been so much as touched upon by our scientists. Has not this root-blight been propagated by the plan suggested above, or perhaps started?

These three points should be kept in mind by all propagators: Healthy, hardy roots, vigorous, healthy scions; no roots used where there is the least chance of their being subject to root-blight; and no scions taken from trees subject to the root-blight.

Now then, coming to the question of the most money out of our orchards for the least outlay, I will say what I have said to this Society for years past: Plant, and grow quickly your orchard, and get all out of it as quickly as possible, and then cut it down when it is through bearing paying crops.

Location of Orchards:

S. W. Gilbert—High ground as you can get for South Missouri.

A. Nelson—I plant on any slope I can get, just so that it is high.

J. C. Bender—In the last few years in North Missouri, the apple orchards have done best on low lands.

J. Ames—At Carthage I find the orchards on the high lands showing weakness, while in the low lands they are healthy. Ben Davis on the lower lands show no failure, while on uplands they are beginning to fail at 18 years. I think that there is more in the nature of the subsoil, and top soil, also, than in the elevation.

Mr. Kirk—In Pettis county we see some of our most profitable orchards on the gumbo land. I prefer other soil because it is so much easier to handle.

Mr. Bailey of New Mexico—We plant on a level plain in the river valley, and irrigate.

J. J. Blakely—In Platte county we think the Missouri river bluffs are the best lands in the world for apple orchards, any slope and all locations; they seem to do best where the subsoil is a clay shale. But we also find some successful orchards on the river bottoms.

A. J. Davis—In Cole county we think the high rolling timber lands are the best. They seem to give the best color and the best quality to our fruits.

S. W. Gilbert—In low lands along the creek bottoms we find a greyish fungus covers the apples and spoils the looks of them very much, as also the quality. For this reason we plant on the high lands.

Question of Mr. Ames—What has been the treatment of your orchard?

J. Ames—The orchard I referred to is my own, a short distance out of Carthage. It has been in cultivation in the small fruits for the last 10 years, and has had the best cultivation and care. The Winesap trees have failed most; the Ben Davis the least.

Have you given it severe pruning?

Yes; I had one of those professionals in the orchard.

A. Nelson—Many, very many orchards have been ruined by pruning too much. Large limbs should not be cut off. I have tried this method and found it a failure. This seems to explain the failure of Mr. Ames.

Distance Apart:

S. W. Gilbert—On rich grounds, 33 feet; on poor lands, 25 feet.

J. Ames—I would plant 16½ feet each way, and then cut out as soon as they interfere. I find trees do so much better when planted closely.

J. Kessler—I plant in rows 28 feet apart, trees 14 feet apart in the row, and cut out as soon as they interfere.

A. J. Davis—I plant 32 feet and alternate with peach.

Kessler—I know an orchard that is planted thickly, and it does the best of any in my neighborhood. I shall set very closely.

L. A. Goodman—The idea is to get fruit quickly and the most of it. Now, if you have not grit enough to cut down trees when they are too close, then don't plant them too closely; but if you can cut down trees when necessary, then plant closely. We can make more money by planting 16½ feet each way, and can get four crops off the trees before cutting down. If you can make money by chopping down trees, why not do so? I speak from experience, and part of my old orchard was planted that way, and then after three crops part of it was cut down; after five crops, more were cut down, until they were just the right distance apart. The old stump and roots will give feed to the remaining trees.

It takes considerable nerve to chop down a good sound tree about six inches through, but if you can do it, then plant closely; if not, then do not.

Varieties:

J. Ames, Jasper county—Ben Davis, Grimes' Golden. Jonathan are the most profitable for us.

J. Kessler, Gentry county—Plant 60% Ben Davis, 30% Jonathan, 10% Grimes' Golden.

L. T. Kirk, Pettis county—I find the Grimes failing very young, indeed. I think it very doubtful if they will pay with us.

G. F. Espenlaub, Wyandotte county, Kansas—Names Ben Davis, Willow Twig, Jonathan, York Imperial.

A. J. Davis, Cole county—Names Ben Davis, Willow Twig, Jonathan.

S. W. Gilbert—Gives Ben Davis, Ingraham, Clayton, Minkler.

Mr. Kirk—Will the Clayton run small as the trees get old?

Mr. Espenlaub—My trees are 22 years old, and the apples are large as ever.

Mr. Kirk—The new apple, *Hopewell,* is being planted largely with us. It resembles Jonathan, and has been shown at a number of our meetings. One orchard in our county of 90 acres is all planted to Hopewell.

C. C. Bell, Boonville—Plant few varieties, not more than six. Ben Davis is our best shipper. I have sent them to Liverpool, and they sold at the top of the market. Next comes Willow Twig, Jonathan, Winesap, Huntsman, Grimes' Golden. Robinson Pippin is a good one. We need some good yellow apple also.

L. A. Goodman—Thinks we do not want to limit the number to too few; in very large orchards we should have six or seven varieties—Ben Davis or Gano, Minkler, Willow Twig, Clayton, York Imperial, M. Black Twig, Jonathan, W. W. Pippin, Huntsman.

Age of Trees:

J. Ames—I never will plant trees more than one year old in the apple orchard.

Many others expressed the opinion that we should never plant older than two years.

The Secretary gave his experience with a lot of yearlings in the nursery. They were cut off at the ground in the spring and one sprout let grow, thus giving a good strong tree about five feet high and short branches on all sides, with a strong center stem, the tree having a two-year-old root and one year top. This makes, for large planting, a model tree, and the best he ever handled. If your yearlings are rather small, this is the best plan to follow in the nursery. The center stem must never be cut off; let it always be the leader.

Pruning to stimulate growth must be done in the spring, but to check growth must be done in the summer.

Cultivation :

S. W. Gilbert—Thorough cultivation; grow no other crops in the orchard. Keep the ground loose with a double-shovel plow. In the fifth year use the cow-pea for a fertilizer; let them cover the ground and plow under or leave as a winter protection.

J. C. Bender—Grow all the crops you choose, but let them lie on the ground as a mulch. Weeds should be cut with a mower and let be for a mulch. Ground will be getting better instead of poorer.

H. Schnell, Glasgow—Keeps his orchard for five years in crops of corn, potatoes, berries or vegetables, and alternates with clover. This orchard is admired by all who see it.

Prof. Keffer—Treat the orchard as you would any other crop. Cultivate the trees as you would a corn crop. Too many make the orchard a secondary crop, and the crop in the orchard the first thing to see after, while the opposite should be the case.

Mr. Kessler recommends buckwheat as a good crop in the orchard, a good one also to plow under for fertilizer.

J. Ames—I am afraid to crowd the growth; I fear it injures the vitlaity of the tree. Cherry trees that I have cultivated most are the largest, but they likewise show signs of decay the most. Pears that have had only poor cultivation have blighted less than those which have been thoroughly cultivated.

L. A. Goodman—Our discussion is on the apple orchard, and the pear and cherry both require different treatment from the apple. If this discussion is to cover all the ground, then when the peach, pear and cherry come up, we will have no discussion.

Mr. Schnell—My soil is sandy and washes badly. I have to use clover to stop its washing.

Mr. Bailey, N. M.—Trees grow rapidly enough with us. Trees five years old are 16 to 24 inches in circumference. We cultivate in corn altogether—raise 50 bushels per acre.

A. J. Davis—Fine surface cultivation is the best, not deeper than two inches, but go over the ground often.

Fertilizers :

S. W. Gilbert—The cow-pea is the cheapest fertilizer we can get. They grow enormously, and either plowed under or left as a mulch, they serve a good purpose. Likes drilling them in the best. Sow them the last of May or the first of June.

President Evans—Hogs like them, and if you choose you can feed them down. You can sow them as late as July. You can buy them in Memphis or St. Louis at about $1 per bushel.

The following from Mr. Hartzell touches the facts of orchard-growing, and is here submitted.

SECRETARY.

To the St. Joseph Horticultural Society :

Your correspondent, a member of your Society, hereby makes report of a recent journey and tour of inspection of fruit and agricultural interests for the benefit and encouragement of these interests in Missouri—first in Missouri and Kansas, then further south, even to the great pear-growing locality of Southern Texas, at North Galveston, Alvin, Virginia Point, Webster City, Hitchcock and Arcadia. I saw the great pear orchard of Mr. Stringfellow at Hitchcock, Texas, and held an extended interview with the owner and proprietor, Mr. Stringfellow. I ate of the pears grown in that great orchard. Am quite well prepared to give many items of interest to any person desiring to investigate. I offer hereby the sequel—the result of my investigations—having solved the question, the cause of the remarkable success of pear-growing on the Gulf coast, which is because of its approximate nearness to the salt water. The land is on a level with the Gulf of Mexico, and the constant presence of the Gulf breezes, together with the effects of salt in the land, same as it is on the Pacific coast, where pear-growing has attained such profitable proportions, but giving the pear-eater a very inferior pear when compared with Missouri pears of same name. The Keiffer pear of Texas is not near the equal of the Keiffer of Missouri as a table pear.

My investigation and researches for the past 10 years' coupled with more recent developments and disclosures made at the Chicago World's Fair, have fully and clearly decided that Missouri, as a fruit-growing state, is not excelled by any other, either in quality or quantity per acre, when proper attention is given to the business from start to finish by the orchardist; enough is now known of suitable soil and climate in Missouri for successful fruit-growing, to fully justify further effort and perseverance in the more progressive channels; giving up the old ways which have been abortive, namely, planting trees without preparing the land, planting too many to the acre, and refusing to grow trees for profit; very many otherwise intelligent men argue in favor of short-lived trees, short body trees; and short profit trees is the result, sure.

Seeming great success sometimes is seen in very young orchards, with all the above named non-progressives to modern and to previous death-dealing measures, always attributed to natural causes instead of giving credit to the real transgressor; when the very young orchard fails to be as productive as at the start, it is evidence that a wrong beginning is the cause, and not always the adverse season or natural cause.

Yes, I could give you very many names of men in many localities, as well as a description of many orchards in many parts of the United States, where I have been a close observer of all that pertains to horticulture and agriculture. I am not an office-seeker, nor have I an ax to grind, but I do desire to assist the wealth-producer—the agricultural and horticultural interests—in all ways possible, from the preparation of the soil to the best result in marketing the produce. I have witnessed the results both in fruit and grain production, where poor and imperfect work caused many complete failures, and also have carefully performed the work and observed others making great success in crop-growing, from the more progressive measures now becoming more fully known from old Pennsylvania to west of the Missouri river, and from the lakes to the gulf, over many states, taking close observation of men and things, both in horticulture and agriculture, and therefore feel fully prepared now to say that Missouri has a bright future in prospect, and it only remains for the progressive workers to take higher ground, to get out of the old ruts, and move to the front and occupy their places properly, and to accept all and every good offered help carefully, but also progressively and in earnest.

Yours for better work,

CONRAD HARTZELL.

CAUSES OF FAILURE, PROSPECTS FOR THE FUTURE, ETC.

F. M'COUN, ST. JOSEPH, MO.

I think it very unkind of our worthy Secretary to saddle all of these subjects upon one lame back, any one of which is worthy of more thought than I feel that I am able to give to them all. I think it a duty incumbent upon every member of this Society to write a paper upon some subject pertaining to horticulture, to be read at these meetings. While it may not always be very interesting to all present, he may say something that will bring out a discussion whereby some one may be benefited.

The causes of the failure of the apple crop of '92 and '93 are the same. The spring of '92 will long be remembered by every fruit-grower throughout the middle and western states for its unprecedented cold rain-storm lasting for six or seven days. Just as our orchards were being fitted by nature to do their part toward filling our coffers and cellars, came these cold drenching rains; in many places ice would form during the night, destroying the pollen, preventing fertilization—where the embryo fruit had formed, causing it to blast and fall; then again, the cold rains checked the flow of the sap, causing the foliage and tender shoots to become dwarfed, caused an unhealthy condition of the trees. The leaves of the apple-trees presented a blackened and sickly appearance all summer under these conditions. It was impossible for the trees to make vigorous and healthy fruit-buds for the next crop; hence the failure of '93.

There are other causes why some would-be fruit-growers fail—a lack of knowledge of what to plant and how to plant; over-pruning. I know some people who murder their trees by heavy and constant cutting. The lack of thorough cultivation is another cause of failure with some.

The prospects for the future—I hardly know whether I understand our Secretary's meaning. If he means prospects for next year's crop, will answer. In this portion of the State there has not been a better one for years, except strawberries, which were badly injured by drouth latter part of August and early part of September. If, upon the other hand, he means the growing and marketing fruits, for profit for all time to come, I will try to answer in what I shall say about over-production. I don't think there is any cause for fruit-growers to feel any alarm about overproduction. The danger is all the other way. With orchards failing on exhausted lands of the East, no new orchards being planted to take their place; with opening new markets in the West and South and foreign countries; our facilities for shipping; with 30% of our American people living in towns and cities, and the limited area of fruit-producing country, we cannot produce so much as will reduce the price below a profitable point.

If I have said anything in this paper that will be of benefit to one here, I shall feel that I am amply rewarded for what little time I have spent in writing it.

CARE OF ORCHARDS.

BY D. A. ROBNETT, OF COLUMBIA, MO.

The subject which has been allotted to me is one that includes much of importance, and I fear I am not the one who should have been given the task. But as I dislike to shirk from duty, will give some of my ideas, hoping that our older and more experienced members will pay close attention, and after I am through they will correct any mistakes I may make.

I think the size of trees should be medium: that is, of good normal size for the age of the tree. A tree overgrown is like a boy overgrown: it cannot endure hardships and is more subject to disease.

A tree that has been raised in rich, heavily manured nursery land and pushed until it is over size is sure to be very tender, not having ripened its wood. Again, it is hard to get up enough roots to support a tree so overgrown. The medium size tree will have its wood well ripened and have sufficient roots to continue its growth, and in less than three years will be larger than the overgrown tree set out at the same time and age.

Now, I would not have you misunderstand me and think I want the culls, for I do not think we can be too careful about selecting our stock. I, for one, would never have stock at any price if it did not suit me.

I prefer a one-year-old tree to older ones and would not accept three-year-old trees as a gift were I wanting to set a new orchard. The yearlings can be bought for less money and the freight and boxing is much less, and you can get nearer all the roots up with the one-year-old trees.

I have used nearly all two-year-old trees in my setting and have had the best of success, and would only recommend the one-year-old trees after a careful study of the advantages they have over the older trees.

The heads should be formed low, say from two to two and one-half feet high, with one center stem. Never set a tree with a fork in it. The reasons for low heads are many, a few of which I will state: First, it is natural; second, it is convenient; third, trees bear much younger; fourth, fruit can be gathered easier; fifth, trees will not get out of shape like those headed high. More reasons can be brought out in discussion.

If you allow forks to form in your trees you will never get through with the annoyance, for as long as the tree bears the forks will be splitting and giving away with your fruit.

To keep heads of trees well formed requires but little pruning if given just right and at the right time, but to try to give a rule would be useless. In pruning never cut out small twigs or spurs growing on larger limbs. Many cut these out thinking they will after awhile make cross limbs, but such is not the case. These are your show for fruit, and many persons destroy their first fruit crops by thus cutting away these fruit spurs. These small twigs also answer as a shade for the body and larger limbs until your trees get large enough to shade themselves.

To protect trees from rabbits and borers I use wire cloth, making a tube that will encircle the tree and be 12 to 18 inches high. This is a perfect success for keeping off rabbits, but I cannot say as much for it as a protection from Mr. Borer as I once did, though I am sure it is of great benefit. As long as I cultivated clean, I had no borer, but in last two years I have had a few borers. I take them out in September with a knife, at same time working all grass from trees to keep mice from making nests near my trees. Protect your orchards from all stock by a good fence, and never think of plowing with hogs.

Cultivation is the only road to success. Without it the orchard cannot grow. Cultivation at the wrong season would cause destruction, therefore, we must know what we are cultivating for, and when to cultivate.

First, we should cultivate our orchard thoroughly before we set trees. At least three good plowings should be given ground. Then comes good cultivation from time ground works well in the spring until about August 1st, when all cultivation should cease; for after August cultivation keeps up sap and growth and the wood fails to ripen and get ready for winter.

The hoe is the best tool I have ever found to work near a tree. I use Cutaway (or Dick) harrows to cut as close as I can to my trees, then it is necessary to hoe.

If weeds and grass get very rank after you quit cultivation, use your mowing machine, and allow the weeds and grass to rot on the ground.

If the sap goes down and your trees lose their foliage in November, I would recommend plowing under all rubbish, for by so doing you destroy many insects, and then you do not have to plow your orchard in the spring when the ground is wet. Wrong cultivation is the cause of sun-scald and much of the twig-blight.

If your orchard be on very rich, heavy land, raise a hoed crop on it for four or five years; but if it be light land do not think of replacing the fertility of the land with manure, for you will certainly fail on this line. Clean cultivation is best for light soil.

The training of an orchard should begin the day setting commences. You should trim out any and all bruised and ill-shaped limbs and cut off all mutilated roots before setting. Then be sure to set your trees in straight rows.

My best success in getting perfect rows has been with the use of check-row wire with marks just the distance I want trees set. This carried out well will give you the best satisfaction.

To keep trees erect is a task that can only be done by constant attention in wet, windy weather. However, this must be looked after or your trees will all lean to the northeast, and when the wind has them whipped loose in the ground the roots will become soured and diseased. This is often the cause of death. Never allow your trees to get too deep in the ground, either from setting or cultivation.

Keep your trees headed in: that is, keep them from spreading out so that the limbs when full of fruit will be weighted down to the ground. This can be done with little work if commenced at the proper time of setting and carefully looked after each season.

Wednesday, Dec. 6, 7:30 p. m.

Welcome address was given by the mayor of Fulton, I. N. Sitton, in a few well-chosen words, and responded to by the President, J. C. Evans, in the same way, saying that the Society was here for work and not play.

He then called for the program, after being entertained by the band with a few pieces of well-chosen music.

SOME DESIRABLE NATIVE PERENNIALS.

C. B ELLIOTT, PANACEA, MO.

Mr. President, Ladies and-Gentlemen—Three different classes of floricultureists will listen to the reading of this paper, and the statements, assertions and conclusions herein will seem erroneous to one, if not to two of them.

You are all familiar with the legend about the two knights of olden time, who, happening to meet from opposite directions at a shrine where a shield was elevated on a post, engaged in fierce battle because one asserted the color to be white and the other contended it was black. After a protracted engagement, and when both were severely wounded, they saw that the shield was white on one side and black on the other. Lest we be like them, or like one who "beateth the air," let us first distinctly understand from which of the three standpoints I am treating this subject.

One class I may designate as "commercial florists." They will estimate the value of a new plant according to its value for selling, and the points of value to them would be about in this order: 1. Ease (including rapidity) of propagation and handling; 2, striking appearance; and, 3, availability for cutting purposes; while gracefulness, intrinsic beauty, hardiness and its relation to the rest of the garden would go for but little. Another section of flower-growers may be considered as belonging to this class, though there will be none of them found (unless accidentally) at a horticultural meeting; I may designate them as "orthodox" florists.

They grow annuals mostly, and the same succession of the same varieties only that their great-grand-parents grew—marigolds, pinks, hollyhocks, etc., and their estimate of the value of a plant is based on the amount (mass) of bloom to the square foot, and on whether other people have them.

This paper is not written from the stand point of the commercial florist.

A second class I may designate as "landscape floriculturists," who consider a plant only in its relation to others and to the lawn, and their standard, of estimate of value of a plant, will be widely different from that of the first.

Neither is this paper written from this stand-point.

A third class I may designate as "amateur" or "experimental" growers—those who consider and estimate each plant by itself, aside from its relation to others or to the grounds, and who love to develop and improve new and beautiful flowers; with whom it is an important consideration to grow something not only beautiful, but rare or odd. This paper is written from the stand-point of this last class. For illustration, take

Oenothera Missouriensis (Missouri Primrose). Its roots are very thick, deep, and so brittle as to be difficult of transplanting; it doesn't seed very freely, and the seedlings do not bloom the first year; its decumbent, straggling stems give the plant a ragged appearance in the border; its beautiful silver-gray, narrow leaves contrast so beautifully with its large, broad, golden-yellow flowers, which are from three to five inches in diameter, its being diurnal instead of nocturnal in its bloom. its excellent resistance of drouth, and long season of bloom—all make it a striking and beautiful plant in itself.

One other point, and this preface will be ended. My experience and observation is confined to the southern section of the state; I have no certain knowledge as to the hardiness north of the Missouri river, of the plants I shall describe.

I pass by the native Perennials which are commonly catalogued—such as the different varieties of Asclepias, Liatris, Ferns, Baptisia, Dodecatheon, Iris, Spireas etc., merely mentioning that *Asclepia incarnata* (flesh color), *Baptisia australis* (deep blue), *Adiantnm pedatum* (maiden-hair fern), *Spirea aruncus* (goat's-beard) and *Coreopsis lanceolata*, are exceptionally fine varieties.

First of all I name *Talinum teretifolium.* I have a few yearling tubers with me to distribute to flower-lovers from different sections of the State, and intend sending out some to florists. I shall expect, in a couple of years, to see a full-page ad. in more colors than Iris herself ever dreamed of, something like this: "The new hardy perennial, Tuberous-rooted Portulaca! The grandest novelty introduced since the Russian Sunflower! A thing of beauty and a joy forever! This new candidate for popular favor is a cross between the famous Victoria Water-lily and the Canada Thistle; combining the gorgeous beauty and fragrance of the one with the speed, bottom, hardiness and staying qualities of the other. We have at vast expense secured the entire stock of this new wonder, and, while the very limited supply lasts, will supply it at the exceedingly low rate of —— etc." Then I'll think of the time I sent good money for Liatris graminifolia, Asclepias cornuti, Ipomea pandurata, and Coreopsis lanceolata, and found I had acres already on my farm, and I won't send, but will smile a deep wide smile all to myself.

Talinum teretifolium will prove a valuable acquisition. I have never seen it catalogued or in cultivation by any florist. It grows on limestone ledges where it has but an inch or two of soil, and is subject to the greatest vicissitudes of wet and dry, heat and cold. It has a small, yellow, conical, tuberous root, about three-fourths of an inch in length and one-fourth in diameter. The leaves are cylindrical, about as large in diameter as a straw, and the plant covers a space of three or four inches in diameter. Flower stems about 8 inches, upright, naked and branched; flowers about two-thirds of an inch in diameter, saucer-shaped, rose-pink in color, opening in the afternoon. I have had it in cultivation only one year, but yearling tubers, in good soil, made plants over a foot in diameter and height, with leaves thick as a lead-pencil and 5 or 6 inches long; flower-stems 12 to 16 inches high, and almost innumerable flowers between the size of a quarter and a half-dollar. It seeds very freely, and the plants from self-sown seeds bloom the first year. It is perfectly hardy, Gray says, as far north as Minnesota, and blooms from May to Augnst.

I have already described Oenothera Missouriensis. There is one other primrose that is seldom cultivated, *Oenothera albicaulis* grows erect, branching about 1 to 2 feet high; flowers diurnal, about 2 inches in diameter, opening pure white and afterward changing to rose-color. I have cultivated this only one year, but am confident it will prove a valuable acquisition. It will grow in any ordinary soil not too wet.

Uvularia perfoliata (Bellwort) grows from 1 to 2 feet high, and the stalk grows through each leaf, except the upper ones (whence its name of perfoliata). It has pendant, bell-shaped yellow flowers, about 1½ inches long, resembling the Canadense lily. In fact, this plant and the next three belong to the lily family, though not true liliums. Blooms in April and May.

Amianthium Muscatoxicum (Fly-poison), has long, narrow, grass-like leaves about a foot long, spreading from the root; it throws up a naked flower-stalk about 18 inches high, with a close spike 5 to 8 inches long, of small, cream white flowers, which, after a few days, change to dull green, and continue thus for weeks; May and June.

Melanthium Virginicum (Bunch-flower) is a truly grand and valuable plant. The description of Amianthium will answer for it, except the leaves are twice as long and broad, and more keeled; and the flower stalk is from 3 to 5 feet high, with pyramidal head from 5 to 10 inches in diameter, and from 8 to 16 inches long. Blooms in June and July.

Camassia Fraseri (Wild Hyacinth), is beginning to be catalogued by florists. Its name sufficiently describes it, and I only add that it responds grandly to cultivation. Pale-blue in color. The flower spikes, in cultivation, often grow 3 feet high; people who have been familiar with it in a state of nature, generally fail to recognize it in my border.

Silphium (Rosin-weed or Compass-plant), is a finer foliage plant for the lawn, (it is too large for the border) than Caladium esculeutum. It has large ovate leaves, which sometimes, under cultivation, measure 5 feet in circumference, and a stately flower-stalk 10 to 14 feet high; the individual flowers are yellow, about 2 inches in diameter, and resemble a small, single sunflower. Another variety of Silphium, the S. laciniatum, has its large leaves deeply cut, and is a fine companion for the first mentioned.

Lithospermum is sometimes dug to procure a red dye from its roots, grows from 6 to 14 inches high, blooms freely, and its season lasts over a month. The color of the flower gives it additional value. It is a rich, orange-yellow, which is a rare color. Blooms in April and May.

Senicio Aurea (Golden Ragwort) is quite a common plant, and it is strange no florist has yet "boomed" it. It resembles in growth and leaf, the pyrethrum, but the flowers, which grow in umbels like tansy or feverfew are a rich, golden yellow, and it increases and spreads rapidly. Grows from 12 to 20 inches high.

Agave Virginica (False Aloe) rivals the famous Agave Americana (or century plant) as a foliage plant. The leaves grow in cultivation 12 to 24 inches long, and 1 to 3 wide; thick, fleshy, and deeply serrate, and it blooms annually. Flower-stalk from 4 to 7 feet high; flowers are of but little beauty, yellowish-green in color and slightly fragrant. It loves dry, rocky soil, but does well almost anywhere.

All the above, except Camessia, will be found, so far as I know, practically new to cultivation, and, I think, highly satisfactory.

A COMPOSITE GARDEN.

BY MRS. GEO. E. DUGAN, SEDALIA, MO.

A composite photograph is composed of the strongest and best features of numerous persons, and a composite garden blends in one harmonious landscape, flowers, fruits and vegetables.

A composite garden may present to view far different things: for instance, I have seen gardens with a wretched blending of brush-piles, old tin cans, discarded foot-wear and weeds, with here and there a poor pitiful row of potatoes, half smothered and starved from lack of proper soil constituents, and an onion bed in a like neglected state.

Yet a garden may be a thing of beauty, and as a help to table luxury hear Balzac's discoures concerning it. In his story called "The Tradgedy of the Peasantry," he says:

"The dinner, like the breakfast and the supper, was always composed of the nicest materials, and cooked with that science which distinguishes a good housewife from all other cooks. Madam Rigou made their own butter twice a week; cream was a component part of all their sauces. The vegetables came freshly picked from the garden to the saucepan. They who are accostomed to eat salads and vegetables which have accomplished a second vegetation from exposure to the sun, the infection of the streets, and fermentation in the shops, which have been watered by the marketman to give them a deceitful freshness, know nothing about the exquisite flavor of these products to which nature has confided virtues, fugitive, yet powerful, when they are eaten, as it were, alive."

THE POETRY OF THE GARDEN.

This helps to introduce my idea of a garden, but as flowers must be planted to adorn and enliven it, I may be excused, perhaps, if poetry is intermingled with plain prose, as shadow and sunshine, clear sky and rainstorm alternate in the changing moods of nature. In the poem "Maud," one of the sweetest poetic conceptions of the late English laureate, is found the following melodious stanza:

"Come into the garden, Maud,
For the black bat, night, has flown,
And the woodbine spices are wafted abroad,
And the musk of the roses blown.
There has fallen a splendid tear
From the passion flower at the gate;
The red rose cries "She is near, she is near,"
And the white rose weeps "She is late;"
The larkspur listens: "I hear, I hear,"
And the lily whispers "I wait."

As we read these lines, we ask ourselves, "What would be poetry? What would be song? What would be home? and what would be our conceptions of heaven were there no gardens and no flowers?" It is, then, not only permissible, but natural, that we should weave into the fabric of our essay a little poetry to adorn and brighten it, as the flowers planted among vegetables adorn and vivify a composite garden.

I know no author, ancient or modern, who more closely touches the spirit of nature, none who for her is a sweeter interpreter, than is the French author before quoted, Balzac. For a most artistic picture of a garden as it should be, I would recommend every one to read his "Tragedy of the Peasantry." He finds soul and spirit where less observing men see only plain, inanimate nature; and the artist who talks of "still life" should hear him speaking of "birches and poplars and all the rest of that intelligent family of trees, with graceful limbs and elegant forms, whose leaves tremble constantly." And again he declares that "Nature with its silence and its tranquil joys, has taken possession of me;" and this he says is true literature. "There is never any fault of style in a meadow."

What a pity it is that so few of her sons and daughters should comprehend and enjoy nature's loveliness, that the glories of the rising and the setting sun, the purity of the air, the grand auroral concert of woods and the singing waters should seem common things, and not what they really are, things full of Divine thought, showing love of the Creator for man, the culmination of his work.

THE HARMONIES OF NATURE.

We go about with blinded eyes, while the world is radiant with sublime pictures. We talk rapturously about "fine arts," and stand in almost breathless awe before a faint and smattering copy of one of nature's master-pieces, yet see not the glories everywhere spread out by her hand for our entertainment. We talk of orchestras and do not hear the bird choruses in the spring-time, nor the tender whispering of the winds among the tree-tops.

"O, fools, and blind," cried an old-time prophet, and we must often echo the cry, for blind indeed is he who hears not the music and sees not the wonderful and ever harmonious pictures made by the mysterious touch of a Divine hand. But we must return to our garden, which is not forgotten even while we are bewailing an almost universal blindness to the beauties of nature.

I carry in memory the picture of a garden I saw last summer, a garden which was designed by a woman, a composite garden, containing fruits, flowers and vegetables. In the center was a mound where were planted first two rows of cosmos, whose feathery fronds made a fine back-ground for rows of carnations and balsams. Edging this mound were several rows of pansies. Between the rows of apple, peach and pear trees were planted strawberries, raspberries, gooseberries, currants, potatoes, cabbage, lettuce, beets, radishes, onions, carrots, parsnips and celery. The rows of cabbage alternated with those of potatoes in this manner: first four rows of potatoes, then four rows of cabbage, of equal width and length. The onion rows alternated with beets; the lettuce was started early in cold frames and was of two varieties, the dark red and the creamy yellow, and was transplanted in alternate heads of each, in rows. The carrots and parsnips alternated, and the beautiful fern-like leaves of the carrot made a pleasing contrast to the heavier and more inartistic green of the parsnip. The celery was of the self-bleaching golden variety, and was planted with an outline border of turnips.

In this garden were beds of zinnas, rows of sweet peas, hedges of dahlias and rows of gladiolus, also beds of tuberoses and many varieties of annual flowers, such as Chinese pinks, nasturtiums, Marguerites, carnations, etc. The garden contained about half an acre of ground, and it was much more admired than the regular flower garden designed solely for admiration. People stopped their carriages to gaze on the perfect picture this garden presented; and one market gardener frequently paused for a long while to study it and said, "It is the most beautiful garden I ever saw in my life."

You may think the flowers could have been dispensed with and the garden still remain fine; this is true, but the flowers added just the touches of color and forms of grace required to render the garden artistic.

I have not mentioned the rhubarb, the horse-radish nor the sage, thyme and other herbs, because they were mostly side issues and did not seem to belong to the garden proper.

To enter this garden you passed under an arch heavy with clematis vines, and between two large bushes, one a white syringa, and the other a purple lilac. Lilies, yucca and roses were along the borders, and yet from just twenty-one rows of potatoes, after using from them from the time they were big enough to eat until gathering time, there were stored away for winter use twenty-five bushels, and they were very fine potatoes too. They were chiefly of the Early Rose and Early Ohio varieties. The cabbage yielded a grand crop, some of which was sold, some made into sauer-kraut, and much consumed during the summer.

The tomatoes in this garden were given space to themselves, and allowed to straggle about at will, but were so arranged as not to mar the general effect; indeed they were hidden by a screen of evergreen sweet corn. Beans were arranged as borders for other vegetables, and only the bush varieties were planted.

This garden yielded a living for a family of six persons, in combination with a poultry yard and two excellent Jersey cows. The only outlay, even to the present time, has been for beef, flour, meal, and the groceries, such as sugar, coffee, tea, spices, and such things as are necessary in all households.

There are now on hand eight varieties of vegetables stored for winter use, besides plums, pears, currants, peaches, grapes and other fruits, canned or preserved—enough to last the family until the coming season, or until strawberries are ripe in spring.

VALUE OF THE GARDEN.

In face of these facts, there are many persons who will insist that a garden does not pay. Not so the head of this household, who emphatically declares that the value of the garden is beyond computation, and that since it has become a feature in the financial economy of his home, the monthly meat and grocery bills are not more than one-third of their former magnitude; of course this includes the products of the dairy and the poultry-house. Indeed, he goes so far as to assert that from what he knows of the value of half an acre of ground judiciously cared for and cultivated, a family of six persons could live comfortably on the products of five acres of ground, near a good market, if economy and business tact were exercised.

In concluding this paper I will give, by special request, a list of 12 best bedding plants and 12 best roses; this must be given from my own point of view, and may be open to criticism, as there are "many men of many minds" on all questions pertaining to horticulture, as on all other questions; and where perfection is yet far in the future, no one may claim infallibility.

The 12 best roses according to my experience are these: of Hybrid Teas, Bon Saline, La France, Perle des Jardines and the Bride; of Chinese and Bourbons, Hermosa, Agrippina, Appoline and Madam Jean Sisley; of Hybrid Perpetuals, Paul Neron, Gen. Jacqueminot, American Beauty, and the White Baroness Rothschild. The list omits many of my favorites, among which are the lovely Polyantheas, and climbing roses, which should be in every garden. Indeed, there are many roses which are equally as good as those named here, and one can never have too many, unless he has more than he can take care of, for they are, of all the floral kingdom, the fairest and most fragrant creatures. Hear a fond lover caroling:

"Sweetheart, my own sweetheart, send me a red, red rose;
Let its subtle fragrance thy tender thoughts disclose.
For roses, my darling, were planted above
And sent to this world as the emblems of love."

I have often wondered if Thomas Moore fully comprehended the touching pathos contained in his undying song, "The Last Rose of Summer;" he certainly never heard our own gifted and universally mourned Emma Abbott sing it, and thus he missed the most perfect blending conceivable of the souls of music and poesy. Moore had a passion for roses; they twine and clamber, glow and shed their fragrance all through his poems, and it has proven true in his own case that:

"You may break, you may shatter the vase if you will,
But the scent of the roses will hang round it still."

The following sonnet seems to have been written for some fair singer who had sung "The Last Rose of Summer" as our beloved Emma used to sing it:

"The young rose which I gave thee, so dewy and bright,
Was the floweret most dear to the sweet bird at night,
Who oft by the moonlight o'er her blushes hath hung,
And thrilled every leaf with the wild lay he sung.
Oh, take thou this young rose, and let her life be
Prolonged by the breath she will borrow from thee;
For while o'er her bosom thy soft notes shall thrill,
She'll think the sweet night-bird is courting her still."

BEDDING PLANTS.

In selecting bedding plants, there are so many varieties one should have, that here also, a choice of 12 seems difficult, but I will suggest coleus in many varieties, caladiums, cannas of the dwarf sorts, geraniums, abutilons, the entire family of funkias, the family of Achyranthes, tuberous rooted begonias, carnations, chrysanthemums, fuchsias, and the golden sunflower. In addition to these, let me suggest that in every garden there should be sweet-peas, pansies, nasturtiums, heliotrope, sweet alyssum, mignonette and many other varieties of annuals. The Iris family should also have a place, and there should be an abundance of lilies; in fact our gardens would be sorry affairs were the bulbs left out, as we must have the lovely gladioli, as well as the splendid collection of hardy bulbs, and calla, the amaryills, the ornithogalums, and the sacred lilies for house planting.

Of shrubs, I favor many of the old-fashioned sorts. The lilac, purple and white, the tree honeysuckle, the altheas, the syringas, spireas, hydrangeas, deut zias, weigelias, Japan quince, sweet-pea shrub, forsythia and snow-ball. This list does not include the beautiful and graceful climbing varieties, only my choice among the upright, self-supporting shrubs—such as will require little care after planting, and be most satisfactory to the amateur gardener.

Our gardens and our lives should be
Full of natural harmony;
All things of a doubtful mien
Ne'er within their borders seen.
Fruits and flowers, yea, all things good
By human wisdom understood,
Should thrive and grow, until above
They bloom eternal, kept by love.

FRUIT GROWING—THE POOR MAN'S FORTE.

BY N. F. MURRAY, OREGON, MO.

It seems to be a law of nature for the strong to rule over the weak and the rich to oppress the poor. All nations, states, towns, cities and communities have had their poor, in all ages of the world. And here in our own country, where the Creator has strewn rich gifts with a liberal hand, where all men are equal before the law in the race for life, liberty and the pursuit of happiness, where the government has stretched out her fostering arm and with the hand of charity given hundreds of thousands of rich fertile homes to the poor of our own and other lands, and where it would seem that all who desire might, by industry and economy, own at least a small home, and sit beneath their own vine and fruit-tree, we have our full share of the world's poor. "For ye have the poor always with you;" so said our Saviour more than 1800 years ago; and how to improve the condition of this class and elevate it to a higher plane has been and will continue to be an inexhaustible theme for the philantrhophist in all time to come.

In treating the subject I have chosen for a paper on this occasion, I do not expect to produce a panacea for poverty. To attempt to do so would be folly, but may I not hope by an earnest effort and presentation of facts to be able to cast a gleam of light along the dark, shadowy pathway of the poor and unfortunate ones, and revive the lingering embers of hope, ere the vital spark shall fade and die, and a human soul go into eternity feeling that this world was too cold and narrow to give it even a comfortable temporary dwelling place.

ONE FATAL MISTAKE.

One of the most fatal mistakes of our race is our disregard and contempt for little things. We all want to do something great. We wish and long for large possessions, and to carry on business extensively. Many, if they can't have a large farm, or a large orchard, won't have any. The American idea is to at once soar to the top of the ladder of fame and wealth, in place of honestly and patiently climbing, step by step. Instead of the son beginning as his father did, he wants to commence where the old man left off, and many, because they can't achieve wealth and fame at once, become discouraged, sour and morose, and soon drift into the ranks of the great army of tramps and vagabonds that are besieging our great cities, and are fast becoming a menace to our State and nation.

NOT ACCOUNTABLE FOR WHAT WE CANNOT DO.

How much better it would be, if none would despise the day of small things, or refuse and reject small opportunities; if we would only do with our might whatsoever our hands find to do, remembering that the hand of the diligent maketh rich. Let us remember that we will be held responsible for the one talent we have, but not for the many we have not; for the small opportunity of doing what we can, and not for the great opportunity of doing what neither God nor man expects us to do.

Many men of small means imagine if they had the rich man's wealth to start with they would soon achieve success, but this is a great mistake. In some cases it would only tend to make their condition worse. I once knew a man who had 100 acres of rough, cheap land, on which he was making a comfortable living. Oil was found near by, the rich man came and paid him $100,000 for his farm; with this he embarked in speculations of which he knew nothing, and lost all. With farm and money both gone, his condition was worse than when he was worth but a few hundred dollars. Even the sharp, shrewd, money-making rich, in their greed for more, often overreach themselves and lose all; but if not, and if by sharp practice and combination of capital, soulless corporations and blighting trusts, they at last succeed in amassing great wealth, and building princely homes upon the ruins of their fellow-men, what then? The last sad scene in life's great drama, death! When the death of J. Gould was made known, all Wall street was in a flurry to know how much money he left, and some thoughtful sage replied, he left it all.

THE POOR MAN'S HELPER.

But wherein is fruit-growing the poor man's forte? In the fact that it does not necessarily require a large amount of capital to engage in the business; a very few acres of cheap land will do to commence on, which, if planted in small fruits and well cared for, will soon yield enough to live on, and, if continued, will pay for a good farm. We know of men here in Missouri this year who cleared from $100 up to $500 per acre on berries. Then again, the planting, care and cultivation of trees and vines, the picking, grading and packing of fruit, require to be done by hand labor, and with such care as but few, save those who are interested, will give it; hence the fruit-grower has a better chance to hold his own against capital than in almost any other occupation.

THE USE OF MACHINERY.

In many of the leading industries, capital and labor-saving machinery have made such radical and wonderful changes that there is but little, if any, chance left for labor to compete single-handed and alone. For a generation past we have seen the restless tide of emigration from Europe and the Atlantic sea-board roll westward like a mighty wave, spreading over and settling down on all our fair rich lands, and far out over the arid plains of the great American desert and when a few months ago the Strip was thrown open to settlement, men and women made one mighty rush, bearing down and trampling each other to death in their maddened frenzy to secure a home. But now, after this great tidal wave of struggling humanity has spent its force—and much of it has been sadly disappointed—tens of thousands are rolling backward, seeking and finding better and more genial homes in our own beautiful Missouri, the best of all states—not alone the land of the big red apple, but a land where we grow all fruits in great profusion, from the "blushing strawberry queen"

TO THE BIG RED APPLE KING—

A State with millions of acres of the finest fruit lands that God ever made, whose virgin soil has never yet been turned by the plow of the husbandman to kiss the sunlight of heaven—a State with inexhaustible mineral resources, a State with great rivers and vast motor power for manufacturing, with broad and inexhaustible bottom lands, with rich rolling prairies, with timbered hills and mountains, with beautiful sequestered valleys—a State with room for hundreds of thousands of unfortunates to find a safe retreat from the blizzard-stricken and sun-scorched plains of the west, and from the over-crowded cities of the east, and make beautiful, happy, luxurious homes, where they may rest from the din and strife of city life, free from the fear of soulless corporations, and where their happy dreams will not be marred by the landlord's bill for rent. I would say to all those of small means within our borders to remain in Missouri, and to the same class in other states, come to Missouri. To hunt for a better land, one offering greater opportunities, and one of grander possibilities, is a waste of time; and now is the time, embrace the golden opportunity, and secure a home in God's highly favored land, and while you can do so at a trifling cost, secure a spot for yourself and family, build a home, surround it with fruits and flowers. Stock up your library with wholesome literature, especially such as pertains to your own calling. be ambitious, energetic, faithful, earnest and cheerful. Bury your sorrow, look on the bright side of life, remember that both God and man will help those who make an honest, earnest effort to help themselves.

MISSOURI A FRUIT STATE.

While Missouri is known as one of the foremost fruit states, and the sale of her fruits amounts to $15,000,000 to $20,000,000 annually, yet our fruit area is so great that we may truly say that fruit-growing in Missouri is yet in its infancy. Much of our choicest fruit-producing land is, in a great measure, unknown and unappreciated; the people of Missouri annually pay hundreds of thousands of dollars for grapes, peaches and other fruits, grown in distant states on land that sells at $100 to $300 per acre, while we have millions of acres of better fruit-land that can be bought at $5 to $20 per acre, with a good home market—the prairie farmer and stock-grwer who don't care to grow fruit, and the towns and cities, at home, buying all good fruit offered at prices in general much higher than is obtained for fruit in the famous fruit centers of the East or on the golden shores of the far-famed California. Surely with all these great advantages and grand opportunities, fruit-growing in Missouri is the poor man's forte. Then take new courage, and with faith in God and country, strike for a home for wife and children; remember there is no place on earth like home, and strive to make it one of joy and love, at least an emblem of that better and never-ending home above. And in the language of Whittier, permit me to say:

> That he who blesses most is blest,
>   And God and man shall own his worth
> Who toils to leave as his behest
>   An added beauty to the earth.

PLANT AN ORCHARD.

BY WILLIAM M'CRAY, COWGILL.

As I am now an old man past 74 years of age, I may not be able to attend your meeting, but I hope it will be a success, as it will be held at a good old town, and made up of a kind, good people I first saw Fulton in April, 1828. I was then a boy about nine years old. I lived at Millersburg, a small town 12 miles west of Fulton, where I became acquainted with many of the good people of Boone and Callaway counties. Many of them have gone to the great unseen.

I am glad to say that some interest in fruit culture in late years has been shown here in Caldwell county by men who have planted quite large orchards. But it is well for us all to remember that in the growing of an apple orchard much labor and patience and many other things are required to make it a success.

Many good people that plant orchards don't make it a success, because they are not naturally qualified for the business. These same people may be well qualified for some other pursuit in life and make it a success. We should know how to plant the trees, which ought to be done very carefully. After planting we must watch closely for the apple-tree borer and many other insect enemies.

Many new varieties of the apple are now being planted, but I think it may be well for us not to quit planting some Jonathans, Rambos, White Bellflowers, Northern Spys, etc. Our Ben Davis is a nice selling apple; the trees are not a long-lived tree like the Jonathan. Our Maiden Blush is a good apple. The Jonathan is a nice, good apple; they fall off the trees easily from the effects of the wind. Now is a good time to plant orchards. The most of our old orchards are about all gone, and the population of our country is increasing at a rapid rate. We are now experiencing the effect of doing without apples. We all know it is much trouble for us that have formerly had plenty of apples, to do without them.

We all ought to encourage our young men and boys especially to learn as much as possible the science of horticulture. Fruit is almost as necessary a part of our food as bread. The teachers in our schools ought to impress these great truths as much as possible. Most all of our hilly lands would grow grapes and apples. The fertile elements of our soil are continually wasted, as they are carried to the sea by the waters of our great rivers and are lost forever. Our population is rapidly increasing all the time. We are continually losing the elements by which we live, and the aggregate of our lives is increasing continually. It would seem from these facts that we may be gradually coming to starvation, but we will likely not see that time. I hope the meeting at Fulton will be a success, as so much will be said by the eminent and distinguished citizens of our State to make it such.

A VISIT TO THE OLD HOMESTEAD.

BY MISS LAURA A. NELSON, OF LEBANON.

How much is expressed in these few words. How much suggested, only those who have feeling and keen sensibility can appreciate. What a picture it brings before us of a happy past, of an unbroken family circle. The time when father, mother, sisters and brothers gathered for home cheer around one fireside; before the boys had been fired by ambition to go into the world and seek their own fortune, and the girls been won as help-mates to cheer other homes and hearts. Ah, but we now speak of it as the "old homestead." The ones who made that once happy home have long since scattered—some risen to honor and fame, fulfilling the ambition of their youth, others whose lives have been successful, and still others who have been rudely snatched by the hand of death, but in God's own time will be, we pray, a united family in an eternal home, not, like our earthly one, subject to change and decay. I have let my imagination roam too far. I shall come from sentiment to reality, and tell you of my visit to my father's old homestead.

Nearly one year ago I left my home in Lebanon, Mo., to visit my relatives and friends in the grand old state of New York. The beautiful and picturesque city of Buffalo, the city of my birth, was the first place I visited. I was overwhelmed by the changes, as the growth and improvement had been phenomenal, but what surprised me most was the change in my childhood friends, who, like myself, had put away childish things and had blossomed into young man and womanhood since our separation. There was among the many changes one thing that remained as I had left it—grand old Lake Erie. How I drank in the beauties of that scene, the rays of the declining sun upon the foaming waves, and watched the vessels sail in like so many white-winged birds. The enchantment of the scene made me wish I had come to stay. However, I must not linger in the beautiful city.

I have other friends to visit and other places that are near and dear to me.

One morning, the 1st of June, an ideal time for a visit to the country, my cousin and I left Buffalo for Oneida county, to visit the old home of my parents. We were met at the station by relatives and taken to their home in the beautiful little town of Verona, which is surrounded by lovely, fertile and salubrious farming lands and grand old orchards, owned by men who have given their lives and put forth their best efforts for the cause of horticulture, as well as agriculture. In this quiet little town my father's early religious training began.

There was a greater charm to me in that simple, unpretentious little building, where father as a boy attended church and Sunday-school, than in all the grand cathedrals I had seen before. The place of most interest was yet before us, the former home of my father and grandfather. Through a lovely country studded with fields of waving grain, beautiful orchards and prolific gardens, we drove with our uncle in his "one-horse shay" to where we saw the old home which once meant "Home, sweet home," to my father, and there stood the trees with their sturdy bodies and waving branches, that he in his boyhood days had planted—then like himself, young and tender, but now strong, grand and old, throwing out their branches to protect man and beast from the scorching rays of the sun, while he has thrown out his thoughts and knowledge to protect horticulturists from insects and other things that menace and destroy plant life.

Those grand rows of trees will stand to refresh many generations, and no doubt his children's children will some day look upon them as a living monument to his early efforts along this line, as well as the people of Missouri, for generations will profit by the efforts and knowledge of such men as our worthy President, J. C. Evans, and his co-laborers, Goodman, Murray (and hosts of others). We fully appreciate the sentiment contained in those beautiful lines of Lucy Larcom on the planting of a tree:

> He who plants a tree,
> He plants love.
> Tents of coolnes spreading out
> Above wayfarers he may not live to see.
> Gifts that grow, are best;
> Hands that bless, are blest;
> Plant! life does the rest.
> Heaven and earth helps him who plants a tree,
> And his work its own reward shall see.

But I digress. Not far distant was the old school-house, whose silent walls told no tales of the many whippings the unruly youth had received in the past, as the ruling spirit of the time was, "spare the rod and spoil the child;" according to that, we judge the chastisement was frequent. Near by the dear old home, church and school, is the beautiful little cemetery, where are buried the grandfather and mother, and other relatives sweetly sleep. This little spot is cared for by tender hands and loving hearts, and overshadowed by the grand old trees, protecting them from the winter blast and the scorching rays of the summer sun.

But I must turn my back to the dear old home, with its sweet and hallowed associations, the memory of which will ever linger like a sweet refrain from the song of other days.

Other homes are found dotting the country over, vacated by those who built them. Other families have separated and dispersed and aided in the development of our great and glorious country, to build its institutions, cultivate its soil and plant orchards, vineyards and gardens—not alone to make the whole like "the garden of the Lord," but as well to prosper in all that is good and desirable for the upbuilding and development of man, the home of millions of freemen, honest in all their thoughts, just in all their ways, the last great nation to emerge from the hands of Divine Wisdom, His loved and His own.

At this great meeting of the chosen sons of horticulture, I would impress the thought that, though we come from widely separated homes and parental hearthstones, though unlike in person as in origin and place of birth, all have one heart and theme, and all seek the good of each other, in the dissemination of useful and practical information adapted to the enlightenment of other men, and their improvement in the social and commercial world; for, as that which hurts one hurts all, so, and much more, that which helps one benefits all. This meeting, therefore, is for the personal good of each, and the general well-being of all. If, then, where one member suffers, all other members suffer with it, how much more when one member receives benefit, the good done becomes disseminated and widely distributed, and the human family is made to partake thereof through the ever-aggressive and enterprising press. How much one man owes to the good another has done is exemplified in the old home and homestead referred to, and in thousands of others, for most assuredly the trees there now found, that were intelligently planted, have borne good fruit, and will for many years to come, for the benefit and good of all within its reach. And so as we journey through life do we each leave our impress for good or for evil, and it is that the good may predominate that such meetings as these are held, where the combined wisdom of the horticultural ages is naturally found, to be communicated from man to man, and by the members and through the press to the great and good world at large.

It is well that we neglect not the assembling of ourselves together, for the young may die and the aged must. How then are they to impart their intelligence ere they go, unless it is at your great annual meetings? How shall they drop their mantles upon those who are left behind, unless they tell us of the good they have learned, and instruct us also in wisdom's ways? I know that my own dear father's most earnest wish is to first learn—and the learning involves toil, expense and careful observation and study—then to impart what he has learned, that his fellow-farmers and fruit-growers of this great State may not only know how much he has done, but the means by which it was accomplished, and thus be able to go and do likewise. But he is not alone; there are hundreds of earnest souls in the ranks just as enthusiastic and unselfish, for is it not the theme of the tiller of the soil that 'tis for his fellow, not himself, that he labors? In your representative press you have a marvelous power for good, for it is earnest, enterprising and indefatigable, planning and contriving both early and late, in season and out of season, for the good of the cause and the benefit of all. May you have a grand meeting, one that shall long be remembered in the annals of horticulture in the State as "the noblest of them all."

THURSDAY, Dec. 7, 9 a. m.

Meeting called to order, and opened with prayer by N. F. Murray.

The following committees were appointed:

On Fruits—G. F. Espenlaub, D.A. Robnett, C. A. Keffer and E. L. Pollard.
On Finance—N. F. Murray, S. W. Gilbert and R. J. Bagby.
On Obituary—J. Ames, Sam'l Miller and J. J. Kaiser.
On Final Resolutions—C. C. Bell, L. T. Kirk and A. J. Davis.
On Agriculture—A. J. Blake, John Wilcox and D. M. Dunlap.

STRAWBERRY CULTURE.

BY HENRY SCHNELL, GLASGOW.

Mr. President, Ladies and Gentlemen:

The subject assigned to me as per program is "The Strawberry, Soil, Cultivation, Varieties, Rust." While I have been growing strawberries for market for 14 or 15 years with fair success, I am certain I could talk to you on the subject at home in the patch, and make it more interesting for you than to write and read a paper.

The strawberry stands at the head of the list of small fruits. It can be grown in every part of the United States, from Maine to California, and from the Gulf of Mexico to the extreme north in Canada. It scarcely ever fails to make at least a partial crop. We have never known it to fail entirely. It is one of the most healthful of all fruits. It ripens at a time when other fruit is scarce, and is the first to ripen in the season, the most luscious of all, and we may add, the easiest grown; still, so many who might have a bountiful supply, with a small outlay and a little care, do without entirely, or buy a few occasionally. We often hear persons say that they can buy their berries cheaper than to "bother with growing them." With some we are quite certain this is the case, as the quantity they buy does not cost them as much as 100 or 200 plants and the care of them would cost. Take a family with four or five children: how many times during the berry season do you think they enjoy the luxury, when the berries have to be bought? Perhaps not at all when they are scarce and high. How different this would be if from a bed in the garden three to four gallons could be picked daily during the season, and a small one it would need to be to furnish this amount. We remember picking 130 quarts one day from a row 400 feet long; one-half of such a row would have produced enough for a large family to eat daily during the berry season, besides enough to can and preserve, and the berries would not have to be divided up into so many saucers to make them "go round," as the case often is when they are purchased. Let no one with even 200 square feet of ground fail to plant and cultivate a few strawberries. An old saying reads, "God undoubtedly could have made a better fruit than the strawberry, but He never did."

SOIL.

The strawberry will grow in most any kind of soil. Most any kind of land that will grow good potatoes will grow good strawberries. While they need an abundance of moisture, especially during fruiting time, they will not flourish in a wet soil where water will stand. They require a well-drained soil, either naturally or artificially. Too much rain with little or no sunshine is often very disastrous to the crop. We had this experience the past season. Continuous rains caused them to rust or blight, and a half crop was the result.

PLANTING.

This should be done as early in the spring as the ground can be put in good shape, but never plow your ground until it is dry enough to pulverize. We usually plant from 10th to 20th of April. The ground is plowed deep and harrowed thoroughly. We plant by a line in rows four feet apart, and plants 15 inches to two feet apart in rows. We plant with a spade, which is thrust into the ground and the handle pushed forward and backward to make an opening; a boy places the plant (dripping wet) into the hole, being careful to have the bud of the plant even with the surface. Then the soil is pressed against the plant by inserting the spade about two inches from the opening made to receive the plant. After the soil is pressed against it with the spade, we press the soil again with the foot on both sides, firming it well, and scarcely ever lose a plant, in even dry weather. Never plant wilted plants; keep them fresh, or set in water until they recover. We never plant on freshly manured land; usually let them bring two crops and then plow under. As soon as the last berries are picked, we burn the old mulch and put on from 40 to 60 two-horse loads of stable manure per acre. Plow at once and grow a crop of late cabbage, celery, pickles, etc. As fine early Ohio potatoes as we ever grew were grown this year on an old bed treated as above and planted July 8th. The following season we grow another crop of vegetables, and the next spring we are ready for strawberries again.

CULTIVATION.

Shallow and often is our advice here. We use Planet Jr. horse-hoe with sweeps attached; never use the narrow steels unless the ground becomes very hard from excessive rains, and then only for the first and second cultivations; use eight hoes, and aim to cultivate and hoe as soon after every hard rain as the ground is dry enough to work and before it forms a crust; after a crust forms the plants are often injured by being loosened, unless done by a careful hand. We make it a rule to work up close to the plants when hoeing, and often use the fingers to pulverize the soil near the plant; never let the weeds get a start. We quit cultivating about September 1; after this date we go over and cut out such weeds as are liable to go to seed before frost, and run a Planet Jr. hand-cultivator along the rows to keep the runners of each variety confined to their row.

VARIETIES.

Of these there are hundreds; some only succeed in certain soils and localities, others again seem to flourish in most any soil and climate. New varieties are introduced every year by the score, and among hundreds a very few ever become popular. Each one should experiment and find what varieties suit his soil and location, as what succeeds with one may be useless with another.

Here at Glasgow we find Beder Wood the best new one sent out since the Bubach and Haverland were introduced. It is most as early as Michel, medium to large size, good quality, robust grower and enormously productive. A little too soft to ship to distant markets is its only fault here. Whether the Van Deman will take its place as an early berry will be seen another year. For late the Gandy is, so far, the best, if it were only more productive. Otherwise it is perfection, firm, handsome, perfect shape, large size, and the plant healthy and robust. If it were productive it would be all one could ask. We planted last spring as in order named in quantity of each, Beder Wood, Bubach, Haverland, Windsor Chief, Parker Earle, Gandy, Capt. Jack, Jessie, Van Deman, Cumberland, Gov. Hoard, Barton's Eclipse. Leader. Of the older ones we have discarded Crescent, Warfield, Sharpless and Chas. Downing, and of the newer ones Felton, Crawford, Lovett's Early, Shuster's Gem, Middlefield, Huntsman, Stevens, Tippecanoe, Great Pacific and some others. While some of the latter were very fine, we did not consider them equal or better than those we planted of the older varieties. Still, what suits us may not suit elsewhere.

PROTECTION.

This we consider a very important item; the strawberry needs protection against the sudden changes and extreme cold in winter. In its natural or wild state we find it growing among the fallen forest leaves and grass; the latter dies down and protects the plants during winter; thus we must imitate nature as near as we can. Various materials are used for mulching—leaves, evergreen boughs, slough hay, corn-stalks, coarse manure, straw, etc.; we use straw because it is the cheapest and the easiest obtained. The last week in November or first in December we generally do our mulching, using about eight loads of straw to the acre, covering the entire surface thick enough to hide the plants and shade the ground, and no thicker, for if put on too heavy and a mild wet winter follows, the plants are liable to smother and rot. About the first week in April the straw is raked off the plants and left lie between the rows to keep the fruit clean, hold moisture and keep down weeds. All weeds appearing before fruit begins to ripen are pulled out.

RUST.

We are sorry to say that we are not able to give any information regarding its cause and effect, preventives, etc.; have been troubled with it but little. Whether to call it rust or blight that caused the trouble the past season we are unable to say, but that wet weather was the cause of it this season we are certain. The berries ceased to grow, were only half size, and the caps or calyx were either dry or badly spotted; many berries failed to ripen, drying up half grown. Bordeaux mixture is recommended as a preventive, though with as much rain as we had last June I doubt if it would be of any value. It will be given a trial another season. We shall be glad to hear from some one better qualified to give us a paper on rust and other diseases of the strawberry.

THAYER, Mo, December, 1893.

I have to report the following on strawberries: A severe frost killed two-thirds of the first blooms, but on eight rods of land I marketed 127 quarts of berries from May 5 to 24; sold for 12½ cents a quart, $15.87, or $317.40 per acre net, besides having a full supply for home use all the season through.

The varieties are Crescent, Bubach, Warfield and Barton's Eclipse. Eleven berries of Bubach of first picking made a full wine-quart box. The Barton Eclipse comes next; were very fine. All these are fine, thrifty growers with me.

Fifty pear-trees planted March 15 made a growth of four and one-half feet in spite of dry weather. Varieties, Garber, Keifler, Bartlett and Clapp's Favorite. The first named outstrips all the rest.

Raspberries have done well for a dry season. For blacks, Hopkins, Doolittle and Mammoth Cluster; reds, Cuthbert and Turner. They have made canes six feet long, notwithstanding the drouth.

Yours respectfully,

N. A. HAMILTON.

SMALL FRUITS—HOW TO PLANT AND CULTIVATE.

G. W. HOPKINS, SPRINGFIELD, MO.

The strawberry being the earliest and first to ripen, I shall commence with it. Any soil that will grow corn, if properly managed, will raise good strawberries. New timbered land is considered best, as berries will ripen several days earlier. New land, when set to strawberries, needs no manure; old land should have a dressing of manure, but not too heavy. If too much manure is applied, the plants will make a rank growth and produce but little fruit. I have known patches to prove almost worthless from the application of too much manure. Ground for strawberries should be level, or nearly so, to prevent washing. The following mode of preparing the ground has proved the most successful with me: Plow the ground deep in the fall—if sub-soiled, that much the better—and scatter manure over it during the winter; plow shallow early in the spring, pulverize thoroughly with harrow, and if liable to be dry, run over the ground with a drag, which will pack the soil and help retain moisture. I set plants in rows four feet apart and 18 inches in the row; as soon as the runners begin to appear, train them into the row. Continue this until the row is thick enough, then let them branch out at the sides until they form a matted row about 16 inches wide. Some varieties (like Crescent) do better if the runners are all kept off, otherwise they make so many plants that the berries soon run down so small that they are unsalable. In setting, I mark off the rows with a small shovel from my Planet Jr. cultivator. This shovel is not more than three inches in width, and makes a furrow just right for setting; with one person to drop and two to set, planting is very speedy. By this process the roots of the plants can be spread out in the row, and not chucked into a small hole, as is the case when set with a dibble.

Cultivation should be commenced within a short time after setting, and kept up continuously until the first of October. In cultivation I use the hoe and one-horse Planet Jr. cultivator, which keeps the ground level; never use a double-shovel, as that leaves the plants up on ridges, and if a drouth occurs, they are more readily killed out. As soon as the ground is frozen sufficiently to bear up a wagon and team, strawberries should be mulched; for this purpose I have found clean wheat straw to be the best; prairie hay is good, but is too expensive to use, except where it is a spontaneous growth. The second year, as soon as the fruiting season is over, run over the patch with a mowing machine or scythe, and cut off plants and weeds close to the ground.

For several years I have not removed the straw from between the rows before cultivation, but have worked it all into the soil, which I find to be an excellent plan; unless the straw has been thoroughly broken up in picking, this cannot always be done, and part of the straw will have to be removed.

In cultivating the second year, take a one-horse turning plow and run the bar next to the row, cutting them down to about ten inches in width. After this the mode of cultivation should be the same as the first year. Three crops are all that can be raised with profit, and some varieties had better be plowed up after the second. The best plan is to have a new patch come into bearing every year. I have found by experience that strawberries do better if the rows run north and south; they seem to ripen more regular and are more generally fertilized.

Varieties—For commercial purposes in this locality, the Bubach No. 5 stands with me at the head of the list, and so long as it continues to do well shall make it my principal crop. I am still setting the old Cumberland Triumph; when the season is too wet it does well in this locality. The Michel's Early I only set for fertilizing purposes, as it does not do well here. For a late berry the Gandy is the best, but it is such a poor bearer there is little profit in raising it. If setting for family use solely, I would add the Jessie and Sharpless, as their quality is far superior to the above mentioned varieties. I want it understood that what I recommend is only for this locality, where experience has taught me what is most profitable. In a different soil, location and climatic surroundings, the list would perhaps be very different.

The worst enemies to the strawberry plant are the white grub, rust and crown borer. I have never been troubled here with these pests, but in some localities they are very destructive.

Raspberry—The raspberry should be set on the best ground, heavily manured. It is hardly possible to get ground too rich for the Black Cap raspberry. The reds do not require as rich soil. The ground should be prepared in much the same manner as for strawberries. Mark off the rows seven feet apart with a one-horse turning plow, and set the plants three feet apart in the row. The tips should be planted early, if possible, before the young sprouts start, as these are often broken off in setting and sometimes fail to sprout again. After the young plants have grown about one foot in height they can be dug up with a spade and set with perfect safety, but in planting a large patch this method would be rather tedious. The yonng raspberries should have thorough cultivation, and the ground kept as near level as possible. When the young canes are one foot in height, pinch off the top.

In the spring of each year cut out the old canes and cut back the laterals of the previous year's growth to within one foot of the main stalk. After the first year the young canes should be pinched back to within two feet of the ground. By this means they will throw out strong laterals and make a stocky growth. After the vines are trimmed in the spring, cultivate nearly up to the time of the berries' ripening. After the fruiting is over, cultivate as long as you can get between the rows. The same plan will apply to the reds, except we never pinch them back in the summer.

Varieties—Of the older sorts the Hopkins seems to do the best. A new variety originated in this county by W. C. Freeman seems to be very promising so far; it is called the Bonanza. Its propagation is as yet confined to a very limited area, as the originator has never offered any plants for sale. Of the red varieties the Turner is principally grown. The Marlboro and Cuthbert are a failure here. I am growing a red berry that came from the wilds of Virginia. The cane is hardy and the berry as large as Cuthbert. I have no name for it, but shall continue to raise it as long as it does so well.

The principal enemies of the raspberry are rust and anthracnose. They are both of fungus origin, and as yet no certain remedy has been found. The rust is the same disease that affects the blackberry. I have never had any of it, but in some localities it is very destructive. The anthracnose is very bad in this locality. It attacks all varieties, and unless it can be checked by some means, raspberry culture will have to be given up.

Blackberry—The blackberry requires good soil, but it need not be so rich as for the raspberry. The ground should be prepared in the same manner as for the raspberry, and the mode of setting the same, except that the rows should be eight feet apart. The cultivation should be the same as for the raspberry. After the first year the young canes should be pinched back to within three feet of the ground, and this practice kept up from year to year. The most serious enemy of the blackberry is the rust. No means have yet been discovered by which the rust can be destroyed or prevented. The best plan when a patch is badly affected is to dig it up and plant a new one in some other place. From a new patch we may generally expect to get at least three crops before the rust appears. Indeed, it seems to be of a periodical nature, for there are times when we see but little of it for several years. The Kittatinny, Western Triumph and Lawton are always worse affected than the newer varieties. With me the Knox and Snyder have as yet shown no sign of rust, though growing by the side of Kittatinny and Western Triumph that were badly affected.

Varieties—After fruiting the Knox for four years, I am free to say, taking everything into consideration, it is the best berry I have ever grown. It is a strong, upright grower, perfectly hardy, rust-proof so far, and the berry is large, glossy and beautiful, with quality as good as any. Now, I don't advise every one to plant the Knox, for in a few years it may go like the rest. There are two objections to the Knox. It is not quite so early as the Kittatinny, and its thorns are ''awful sticky." To the Snyder there are objections: it bears too much, and the berries are too small. I always have to sell them for a less price than the larger berries. In other respects the Snyder is all that any one can ask, and we cannot as yet afford to give it up.

The gooseberry and currant properly come under the head of small fruits, but as this paper is already too long, I shall pass them by for the present.

DISCUSSION.

N. F. Murray—I indorse the paper of Mr. Schnell. I emphasize thorough and shallow cultivation. In the preparation of land for strawberries, or anything else, I am thoroughly convinced that shallow plowing with thorough pulverization is better than deep plowing and poor pulverization. The clods below prevent the moisture from rising. The ground should be plowed in the fall. I am in favor of early planting in the spring. Thorough pulverization of the surface is nature's mulch. In dry weather cultivate so as to smooth down the surface and keep it smooth.

Michel's Early in our county is simply worthless. It will not do any good in our soil. In the Ozark region it may do better. The red lands of that region are the finest fruit lands God ever made.

S. W. Gilbert—I am cultivating a few berries. I find new land is best for them. Take the raw land, clear off the timber and plant. I use a tree fork for a stock for a coulter, with which I cross the land both ways, and then plow it just as near four feet deep as I can with a common plow. This leaves the soil fine and mellow.

I think a great deal of the Speece strawberry. I believe it is the Ben Davis among strawberries in our part of the country. It produces more berries than the Crescent, they are larger, and I can ship them 1500 miles in good order. I don't know whether it is Speece's Beauty or Perfection. What little manure I have, besides a few loads from my own barn-lot, I haul from a livery stable; a little manure goes a long way.

J. C. Evans—No soil on the face of the earth gives more for a little manure than the rocky soils of South Missouri.

Mr. Blake—I have been in South Missouri; if there is any place where the impossible becomes possible, it is there. It is just remarkable. The mineral elements necessary are everywhere just ready for the plant. The possibilities are such that these wonderful things will become common talk. I saw a peach-tree one year from the seed of which I could not reach the top. We have not begun to dream of the possibilities of this section of the State.

C. C. Bell—Mr. Murray has a peach-tree story that I think appropriate here.

Mr. Murray—The tree is at Greenfield, Dade county. It is four feet around above the swell; the swell is five feet around. It broke down year before last with a big load of fruit. Before that it is said to have had a spread of 60 feet. It is a free-stone of good quality.

Mr. Wilcox—With us the Michel's Early grows plants but not much fruit; on old beds it is better than on new.

Mr. Gilbert—I could grow 40 quarts of Crescent more easily than one of Michel's Early.

L. A. Goodman—What about rust?

Mr. Davis—Some varieties rust more than others; it is more in the variety than anything else.

Mr. Blakely—Crescent does not rust; Capt. Jack rusts so it is worthless. I would like to have more information on the subject.

S. W. Gilbert—The only kind that rusted to amount to anything with me is the Parker Earle.

Henry Schnell—What would you call the trouble I had this year? All varieties were affected alike; the plants stopped growing and the leaves died; after the weather dried off they came out nicely again.

Sam. Mlller—I think it was caused by the excessive rains and the scalding sunshine.

Mr. Espenlaub—We generally have rust in a wet season; I think it is caused by wet feet. The Downing is the worst; Capt. Jack is bad; Glendale is one of the freest from rust.

Mr. Polster—Capt. Jack is one of the worst to rust with us.

Prof. Keffer—I am yet to see a strawberry that is absolutely free from rust. We have 120 kinds at this Experiment station. Not one of them is entirely free; some are so bad as to be practically worthless, others are almost free. I doubt if it is desirable to make this a point to test the worth of a variety. Capt. Jack, Chas. Downing and Gandy rust badly.

N. F. Murray—We all know that we have need of water to grow the strawberry, but not in too great quantity at one time. Under-drain to get rid of surplus water. Every locality must study its own soil and climate and get varieties suited to it. Some kinds do well over a wide section, others succeed only over small areas. I am decidedly in favor of abandoning those that rust badly.

Mr. Gilbert—The general impression seems to be that too much water causes rust. I believe that is correct. None of my plants have wet feet. Parker Earle rusts when in dry land.

Mr. Kaiser—I think every man must find out the best kinds for his own locality.

Mr. Coats—I believe that each berry is adapted to certain localities. Downing is the most successful with me. Some rows mulched with coal cinders and ashes did not rust.

Sam. Miller—I think the Beder Wood is one of the best. It gave us all the firuit we had this last season.

Mr. Kaiser—Try 35 or 40 kinds to find what suits your soil. If you have a location like your neighbor, try those that succeed with him.

J. S. Dicus—Can one variety be successfully grown for family use?

H. Schnell—Yes; if you have a perfect flowering kind. Beder Wood, Capt. Jack, Parker Earle, Cumberland and Chas. Downing are of this kind. I would not want a better berry for home use than the Beder Wood.

Lecture by Prof. Schweitzer. (Will be found in "Miscellaneous Papers.")

The Society gave Dr. Schweitzer a vote of thanks for his able lecture, and requested a copy for publication in the annual report.

THE BLACKBERRY.

JOHN E. MOHLER, WARRENSBURG.

The blackberry is indigenous to Missouri. Along our streams and scattered over wooded upland the native vines grow and bear profusely. The blackberry season is a gala day for many of our city children as they roam the country over for the toothsome fruit. The demand for blackberries has for some years exceeded the supply, and our State Society has frequently advised more extensive planting. Many are seeing the wisdom of this advice and are engaging in blackberry culture, and few are relinquishing it. While over-production may result in local markets, the careful grower may expect a profitable market for good fruit for some years to come. Such profits, however, will not likely be so large as to justify careless or expensive methods of culture, if, indeed, such are ever justifiable. The successful fruit-grower will ever employ those methods which will most certainly secure the largest possible returns for all expense in culture.

THE SOIL

For the blackberry should be deep, moderately rich, with a porous sub-soil, although it will grow on almost any well-drained land. A north or northwest slope is preferable, except for early kinds, which should be planted on an east slope, to hasten ripening of the fruit. The land selected for blackberries should have clean cultivation the season previous to setting the plants. Before planting it will pay to pulverize the ground deeply. This is done by plowing once six inches deep, then harrowing this as deeply as possible with any harrow that will thoroughly fine the soil. Now cross-plow with a Hartzell plow, running sixteen inches deep, or a few inches below the soil if the land is thin. Harrow thoroughly again, and then drag or roll the ground sufficiently to firm, but not so much as to pack it.

SETTING THE PLANTS

Should be done in the fall, if you can mulch them, to prevent heaving during the winter. Otherwise set them in the spring. Open furrows seven feet apart and four inches deep, with a wide shovel-plow. The plow should go just ahead of planting, so as to bring freshly stirred soil in contact with the roots of the plant. Dip a bunch of plants in water, then, while carrying them in one hand, with the other hand place them one by one, two feet apart in the bottom of the furrow, and with a slight movement of the foot cover the roots lightly with loose soil. Soon afterward the plants should be covered even with the top of the furrow. A still day is much to be preferred for planting.

SELECTING THE PLANTS

Is an important item, and one worthy of more attention than it usually receives. The foundation of a good berry plantation depends as much upon the plants as upon the condition of the soil. We want vigor in our young plants, but more than that, we want bearing qualities. These are secured, first, by setting strong plants grown from root cuttings; sucker plants make poor yielders. Second, by obtaining plants propagated from good, bearing bushes; this is a point which is scarcely ever noticed. Cuttings are often taken from a bush because of its thrift, without knowing whether it ever produced a berry, or whether its parents or grand-parents or great-grand-parents ever produced berries. We know that in nearly all berry patches there are plants that are in the habit of producing few if any berries. Then there are patches that, on the whole, produce small yields annually. Plants propagated without regard to the yielding qualities of their parents will not fruit equal to those selected with reference to inherited bearing tendencies. We must learn to breed our plants as seedsmen do their flowers and vegetables. We should not be content to have good varieties, but should breed up superior strains in each variety. Nurserymen have not attempted to keep up the fruiting qualities of varieties of fruit, and this is the reason why some varieties "run out," as the degeneracy is called. This is why the Wilson strawberry has "run out." It is why the Hopkins raspberry is "running out," and it is a wonder our blackberries are not degenerating more rapidly than they are.

THE FOUNDATION

For a profitable berry patch is now completed. By following the above suggestions two desirable points will be attained, namely:

1. Serious effects of drouths will be prevented; (*a*) by deeply and thoroughly pulverizing the soil; (*b*) by plants from root cuttings, which will send out an abundance of fibrous roots near the main stalk.

2. Productiveness is increased; (*a*) by plants from root-cuttings; (*b*) by plants propagated from bearing bushes; (*c*) by availability of plant food, owing to thorough soil preparation.

CULTIVATION

Should be given frequently all summer. The cultivator should run three inches deep at first, and this depth maintained in all subsequent plowings. The roots will then approach just so near the surface, and will not become lacerated by the plow. A row of corn or any other crop may be grown between the rows the first season.

PRUNING

Should be done in the summer by cutting off the tops when three feet high. In the winter the bushes should be pruned by cutting off all laterals to within ten inches of the main stem. All trash from pruning should be cut in short lengths and left on the ground about the bushes, if possible. This will keep the surface loose and form a perfect fertilizer for the plants.

VARIETIES.

The Snyder now heads the list for profit; the berries are small, but certain to be there. Minnewaski, which is so highly praised in some places, does not yet commend itself to me. Last winter killed the ends of the canes, and the summer brought but little fruit of ordinary size. I think Western Triumph worthy of planting. Early Harvest, in a protected place, passed last winter uninjured here. Taylor's Prolific is good to extend the season. People should be wary of flaring advertisements of ever-bearing blackberries. I know of none that are profitable here. Ever-bearing blackberries usually ripen but few fruits at a time, yet continue bearing some throughout the season. This makes expensive picking of the fruit, and is no advantage over planting several good standard varieties.

THE KITCHEN GARDEN.

BY MRS. WM. H. BASS, COLUMBIA.

God first planted a garden and said it was good, and thus glorified it with His approbation for all the ages. It has ever afforded man the purest of human pleasures and been both elevating and ennobling in its influence and teaching. In having assigned to me the subject of "A Kitchen Garden," I am happy in that it had so good an origin, and that it is so nearly and appropriately identified with woman the whole country over. I have indeed derived great pleasure from my association with it, and am here to both advocate and urge upon my sisters a close attention to its pleasures and usefulness.

The kitchen garden, I understand, means that spot of ground where woman, if she will, may rule supreme, and by her supremacy, her patience and frugality, afford comforts and delicacies for her family, and in a measure lift the community from the dead level of bread and meat, or the time-honored and much-abused "pork and beans," to something higher and more soul-satisfying in the vast realm of nature in the garden. I take it to mean something above and beyond the "truck patch," in which the lords of creation on odd days may plow in a few rows of corn or beans or potatoes, there to remain at the mercy of stray hours of adventitious work, or to leave them to their own sweet will to come to nothingness, and the most unthrifty and untidy spot on the farm, overgrown with weeds and brambles, a harbor for vermin and a menace to health.

The Kitchen Garden should be a model of neatness. It should be laid off in beds and borders, the paths should be kept scrupulously clean of weeds and in good order. There should be a strict adherance to the idea of utility, both in laying it out, in planting and in conducting it. Care should be taken and judgment exercised in planting, so that sunshine might be afforded to the crops needing it, and shade to those not wanting the sun; and then, too, some beds that are often visited might be so placed as to be handily gotten to and at. Some plants need moisture, others a dry soil, and both can be accommodated if one plans aright.

It is customary to devote the Kitchen Garden to fruits, vegetables and flowers; but unless one has a wide space, I do not think it wise, except for small fruits, the berries and the like; and these should be so distributed as to be both useful and ornamental. Thus hedges of blackberries, raspberries and gooseberries might be made to hide unsightly views and to break the force of north and west winds, without shutting out the sunlight. There are many flowers that never seem so much at home as among their cousins, the vegetables. I refer to the hardy bulbs, most of the annuals, and such old favorites as the cabbage rose, the cornflower, hollyhocks, the ragged pinks and many others which bloom but once in the season, but whose beauty and charming loveliness take us back to our grandmother's garden, so dear to the memory of us all, that it almost seems like being recreant to a sacred trust to refuse them admittance or neglect to care for them.

Then there are the useful herbs which, though not perhaps called for every day, or of every-day use, are yet useful in their place when called for, and call for a little space in every well-regulated garden. Of these I may mention sage, parsley, tansy, calamus, and a number of others which here and there have their preferences.

Again, there are other features which afford the best test of good judgment, refined taste and skilled management; I refer to such things as the asparagus bed and the horse-radish. The first requires a degree of skill in planting and cultivating at first, but once well established, affords an annual supply of rich, wholesome and nourishing food very early in the season, and a dish simply unequaled in the hands of the good housewife.

The great beauty of the kitchen garden consists in its being a *multum in parvo* (much in little). I have found mine an unending source of pleasure and suggestions; and in it have spent very happily many of the spare moments afforded in the raising of a family of seven boys and the care of a large house. Indeed, it has been about the only discipline my boys have had, and I believe that the rod might be systematically spared and work in the garden substituted, not, however, as punishment, but to teach them to love work. Add to this, motherly words ennobling work, characterizing its utility and the pleasure derived from it, and I warrant Satan would find fewer idle brains in which to concoct mischief. If I were beginning with my brood, I should religiously lead them into the garden.

The problem constantly presented to us is, how to make every corner bring forth its due share; it is marvelous indeed how much old mother earth will yield if she is tickled in the right way. Just at this season lay on a thick warm coat from the barn-yard; then in the early spring dress her down and put her in shape, both for appearance and for business, and your table will be supplied bountifully with the best and certainly with the most healthful and appetizing of food all the year round. Now is the time, long before work can be done in the open ground, to make hot-beds to bring forward your plants ready for work so soon as Jack Frost is out of the way and the garden in working condition.

It has been said that of all fools an old man in love is the greatest, but I have been in love with my garden always, and am willing to admit that the intensity of that love increases year by year. It grows to be a passion, but pure and unselfish, and the returns have been too tangible to warrant any one in classifying me with the ancient love referred to. Lord Bacon said of gardens: "Without them buildings and palaces are but gross handiworks, and a man shall ever see that when ages grow to civility and elegance, men come to build stately sooner than to garden finely, as if gardening were the greater perfection;" and so I hold that it is a perfection toward which every nineteenth century woman might aim with no fear of soiling her Christianity, or in any sense detracting from her true womanhood.

THURSDAY, Dec. 7, 2 p. m.

The following letters were read, and a collection of $12 was taken up at the request of the editor of Coleman's Rural World for D. J. Bissell of College Springs, Iowa:

ST. LOUIS, MO., Dec. 6, 1893.

HON. L. A. GOODMAN, Secretary:

MY DEAR SIR—It has come to my knowledge that the venerable D. J. Bissell is in sore strait; sick, without money or any means of securing food, shelter, medical attendance or other assistance needed by a man nearly 90 years of age; helpless, childless and incurably afflicted.

He has done much for the farmers and fruit-growers of the country in his long and practical life, and I beg very respectfully to ask that ere your meeting disperses you be kind enough to take up a collection for the good old man and send it to him at College Springs, Iowa, either direct or through this office.

I have never known of a similar appeal to your Society, or heard of an occasion therefor. But this case appeals so strongly to our sympathies, to the noblest sentiments of brotherhood and manhood, that I cannot but think the members of the State Horticultural Society present will gladly make up a purse as a Christmas present for the good old man.

He dreads being sent to the poor-house, as any man of his intelligence well might; but as he is afflicted with cancer in the face, and too old to work, we must soon find some home for him, or in this great land of plenty, his native land, he will perish in the streets from want.

This, my appeal to you, is but for temporary relief. My next appeal will be to the Governor of the State for a place for him in some one of the eleemosynary institutions of Iowa. But help is needed now, at once, and freely at that.

Will you kindly help me supply the old man with the wherewith to put him in immediate funds, and greatly oblige

Yours very truly,

GEO. LONGMAN.

GRAYSON MO., NOV. 17, 1893.

L. A. GOODMAN, Sec'y:

DEAR SIR—Your card giving notice of State Horticultural Society meeting to be held at Fulton Dec. 5, 6 and 7 received. I cannot be present, although I would be glad if I could. Whenever the Society holds a meeting in this section of the State, I am fully determined to be present. I will offer a suggestion: that the Society publish a list of all kinds of fruit, their time of ripening for each section of the State, Northwest, Northeast, Central, Southwest, Southeast as divided by the State Board of Agricultural—such list to be determined by vote of the Society, at such meetings as they may think best, and no fruit to be listed only such as is thought worthy of general cultivation in each of said sections of the State. To beginners I think such a list would be invaluable.

Respectfully,

WM. L. CULVER.

OREGON, HOLT CO. MO., Dec. 6, 1893.

L. A. GOODMAN, Fulton, Mo.:

DEAR SIR—Much as I would like to be with you at the meeting there, it is impossible to do so. I regard the State Horticultural Society as one of the most important institutions in the State to bring our great State to the front, where she properly belongs; therefore, I regret that our local Society is so poorly represented this time.

Now, as to the Japan plums, I know practically so little about them that I dare not attempt to write on that subject; however, I will say I have faith enough in them to have several hundred trees of bearing age on my farm, but the last two unfavorable seasons have prevented their bearing, except that the Abundance and Spalding have borne some fine fruit; their early and profuse blooming indicates that they mean business, and I hope a more favorable season to give you a more definite and favorable report on the subject.

With us the prospect for the coming fruit-crop is favorable. Berry plants of all kinds are not in first-class condition. In raspberries the Kansas, Palmer and Progress are the most hopeful at this writing. In strawberries the "Bubach," "Barton's Eclipse," "Beder Wood," "Leader," "Dayton," "Timbrell" and

"Van Deman" have defied the drouth and look fine, while many others perished.

Hoping you may have one of the best meetings, I am

Yours fraternally,
J. N. Menifee.

Washington, D. C., Oct. 16, 1893.

Mr. L. A. Goodman, Secretary Missouri Horticultural Society, Westport, Mo.:

Dear Sir—Your kind letter, inviting me to attend the next meeting of the Missouri State Horticultural Society, is at hand. If possible, I shall endeavor to be present, as nothing would give me more pleasure than to meet all of my old friends once more. We have made rapid progress in treating plant diseases since I left Missouri, and I feel as though I could spend a whole day with profit talking with our fruit-growers, and listening to their suggestions. It rests with the authorities here as to my coming. If arrangements can be made, I will write you in due time.

My assistant, Mr. Waite, who has recently returned from Southern Missouri, speaks glowingly of the country as a fruit region.

Very truly, B. T. Galloway,
Chief of Division.

As much as we were in hopes of having our old friend Prof. Galloway with us, we were doomed to disappointment.

St. Louis, Mo., December 5, 1893.

Hon. L. A. Goodman, Secretary Horticultural Society:

My Dear Sir—It has been my earnest hope for more than a month past to be with you and aid in the good work of the State Horticultural Society, at Fulton, but a bad attack of the prevalent influenza has made it imperative that I take no risks of exposure; hence am compelled to await the orders of the Society in my office. I beg to assure you, however, that the Rural World is heart and soul with you in your "work of faith and labor of love," and stands ready to do its share of the work in building the great industry in Missouri and contiguous states with the master builders. I hope most sincerely that you will have a large attendance of earnest, experienced working men—men whose hearts are with you and all the officers of the Society in spreading a knowledge of the gospel of good fruits, and that the outcome of this annual gathering will be a wide distribution of practical information, which shall enable even the new-comer and the beginner to prosecute his work to profit and success.

The officers of your Society have done marvelously well for the good of horticulture through very many years, and the condition of the industry in the State today testifies in trumpet tones to the effect that work has had upon the men in interest and to social and commercial progress. But your efforts at the Columbian Exposition have called attention to the State and its industries in so clear, so forcible and so emphatic a manner, that one cannot but believe great good must ultimately result. The work was good; it was devout, unselfish, earnest, and its results must form the material for the monument to be erected to the memory of the faithful workers in the good cause.

But, my dear Goodman, Missouri is a great State—great not only in the number of its acres, or its pre-eminent geographical position as the foremost of the great central States, but in its fruitful soil, its temperate climate, its undulating surface, its magnificent rivers and water-courses, its unsurpassed mines of coal, iron and lead, and of other important material which enter into the commerce of the world; great in its commercial industries, in its metropolitan cities and their manufacturing interests; in its three millions of people and their love of law, of the social and domestic relations, of religion, literature, the arts and sciences, and all the elegancies of refined life; in its three hundred thousand farms and farmers, producing every crop known to the temperate climate in field, in garden and the orchard; its magnificent forests of finest timber; rail and river navigation of the finest, and last but not least, its hundreds of commercial orchards and thousands of acres of apples, pears, peaches, plums, grapes and other small fruits; great I say in them all, but especially and particularly in these, and even then the half has not been told; and I ask you, what of the future? Are we building wisely and well?

Show to the world through the publication of that which is said and done at your meeting, that the Missouri State Horticultural Society has an intelligent appreciation of its work and duty, and that so far as in it lies, the affairs of the State are in good hands and becoming better as the days pass. I shall be glad to have full reports of the meeting and the papers for publication, and to get them into the paper and before the world at the earliest possible moment. The Rural World assures you of hearty support, as does also,

Yours very truly,
Geo. Longman, Editor.

SECRETARY'S REPORT.

BY L. A. GOODMAN.

A report from your Secretary every six months seems to be one of the necessities of our meeting, for in no other way can I get your ear on many important matters which we should continually keep before us and discuss in all their bearings, and thus outline a plan of work for the future.

For 10 or 12 years have I been giving my best endeavors to build up the Horticultural Society and the fruit interests of the State. We have been trying to get the experience of the fruit men on practical questions, and have them discussed, so that they would do most good. These items of experience and information have been copied into many of our fruit journals, and also county papers, and thus scattered all over the State; and I am sure that any one traveling through the country can plainly see the influence of our Society and its best workers, in the better preparation of soil for orchards, the more judicious selection of varieties for planting, the more sensible and systematic care and pruning, the more intelligent manner of cultivation, and the more honest and correct plan of gathering and marketing, as well as keeping in cold storage.

We can see the influence of our Society in the small-fruit plantation, the manner of handling, the choice of varieties, the distribution to markets and the results obtained therefrom. We can see all this in the vineyards, in the gardens, in the yards, in the parks, in the public grounds, and in the homes scattered all over the State.

This influence has been growing and spreading, and is continuing to spread all over the State in such a way that we find the people better informed on all subjects, and a better class of people owning our lands, as well as taking a higher stand in every phase of life.

The horticulturists are the best people to be found for improvement, and wherever you find a community of them you find an honest, upright, sober, industrious class, with good society, good morals, earnest, enthusiastic and patriotic citizens.

We take pride in our Society, for we think that in the last twelve years, since we have been urging this work, it has done very much for the good of ourselves, our communities, our Society and our State.

The work of the Society for the past year has been at the World's Fair, the Farmers' Institutes, and to help those orchardists who were overwhelmed with discouragement on account of the cold storms, the blight, the mildew, the rust, the scab, the wet, the drouth and the grasshoppers.

The World's Fair work began last June one year ago, and at St. Louis, Columbia, Kansas City and Olden, fruits were put up in jars as they ripened. From the earliest of the strawberry season and going through the whole list, some 40 varieties were put into these jars for show, giving an educational list which was worth studying.

All other fruits were treated in the same manner. There were shown, of

Strawberries	40	varieties.	Quinces	5	varieties.
Raspberries	24	"	Grapes	67	"
Blackberries	18	"	Pears	29	"
Gooseberries	13	"	Peaches	76	"
Currants	16	"	Apples	168	"
Cherries	11	"	Corn, asparagus, peas, beans, cucumbers, beets, turnips, melons, egg-plant, cabbage, celery, tomatoes	213	jars.
Plums, native	17	"			
Plums	14	"			
Apricots	7	"			
Nectarines	4	"			

The whole list embracing over 1200 jars of fruits well filled, and an object-lesson to every one who would stop to examine the collection critically.

This collection was arranged beautifully upon a set of tables and shelving that was second to none in the entire display. I say it, not boastingly, that our State display was equal to any, outside of California, and we felt proud to claim it ours.

Besides this great collection of fruits in jars, we had on the tables from the first day of May until the first day of November, from 300 to 500 plates of apples of 1892; berries, cherries, peaches, grapes, plums, pears or apples of 1893. From the beginning to the end we used no less than 10,000 to 12,000 plates of fruit, and no day of the 180 days but that our tables were full.

Last fall, the fall of 1892, we put in cold storage in Chicago 160 barrels of fine apples, which were drawn on during the summer as they were required. They required changing more or less every day in order to keep clean and perfect the specimens, and this kept three persons busy continually. E. L. Pollard and John Evans deserve the thanks of this Society for the very faithful and efficient service they rendered in their care and attention to the work in its minutest detail. No one who has not been in this work can begin to think of the immense amount of routine work this involved.

A classified list of the persons who furnished fruit and helped to collect the specimens is here given :

FRUITS IN GLASS.

Missouri Agricultural College Experiment Station.
Joseph Geiger, St. Louis.
J. C. Evans, Harlem.
B. R. Ireland, Lexington.
N. Sommers, St. Joseph.
Jacob Madinger, St. Joseph.
N. F. Murray, Oregon.
S. J. Andrews, Lexington.
S. Geiger, St. Louis.
L. A. Goodman, Westport.
S. Miller, Bluffton.
Olden Fruit Co., Olden.
Dr. Blank. St. Louis.
Mrs. Burg, Oakville.
Dr. Thurman, Fenton.
Wm. Luther, St. Louis.
Jacob Studt, St. Louis.
W. C. Suter, Oakville.
J. W. Hearn, Ferguson.
Peter Walker, Oakville.
J. W. Brewster, St. Louis.
J. W. Rosewag, "
J. L. Evans, "
Ferris Penn, "
G. W. Shepherd, LaMonte.
Wild Bros., Sarcoxie.
H. Jaeger, Neosho.
A. Wormbrante, LaMonte.
A. Miller, Carthage.
Nicol Nope, St. Louis.
L. Geiger, Boonville.
J. Rommel, Morrison.
W. G. Gano, Parkville.
Bennet Hall, Carthage.
Wm. Winhein, Oakville.
J. Ames, Carthage.
Wm. Pisper, Oakville.
J. Moore, St. Louis.
Jacob Staudt, St. Louis.
E. P. Long, St. Louis.
Geo. Mueller, St. Louis.
Missouri Botanical Garden, St. Louis.
A. Seaver, St. Louis.
L. C. Amsden, Carthage.
W. Luther, Oakville.
J. Weber & Son, St. Louis.
W. Crecelius, St. Louis.
Jacob Stocke, St. Louis.
E. S. Curry, Christy.
S. W. Gilbert, Thayer.
J. E. Kreybill, Olden.
J. E. Brown, Olden.
R. Brewster, Olden.
Cowen & George, Olden.
A. C. Bridges, Olden.
Sam Gruber, Olden.
G. A. Deitz, Olden.
O. Lins, St. Louis.
F. Penn, St. Louis.
A. Seavers, Jennings.
J. Geiger, St. Louis.
A. Schulenberg, Oakville.
N. Nolke, Oakville.
A. Burkholdt, Oakville.
F. Vantaigne, Oakville.
Th. Finley, St. Louis.
Mrs. Phister, St. Louis.
Mo. State Hort'l Society, Westport.

FRESH FRUITS.

Mo. State Hort'l Society, Westport.
S. W. Gilbert, Thayer.
N. F. Murray, Oregon.
Herman Jaeger, Neosho.
C. Hartzell, St. Joseph.
Henry Schnell, Glasgow.
L. A. Goodman, Westport.
George Wagner, Thayer.
S. C. Tucker, Thayer.
J. C. Evans, Harlem.
John Kaufman, Kansas City.
E. S. Curry, Thayer.
C. Shultz, Oregon.
J. N. Menifee, Oregon.
Joe Kamber, Westport.
F. Eslinger, Westport.
A. Nelson, Lebanon.
W. A. George, Olden.
R. Brewster, Olden.
C. H. Kesler, Westport.
P. Hansen, Harlem.
J. Kirchgraber, Springfield.
G. M. McCartney, Thayer.
K. Royce, West Plains.
J. Engleman, Moody.
Olden Fruit Co., Olden.
C. Thorp, Weston.
J. Levalle, Chain of Rocks.
G. Kelsey & Co., St. Joseph.
W. A. Gardener, West Plains.
A. Seaver, St. Louis.
L. Johnson, Thayer.
R. Bess & Bro., Thayer.
Louis Erb, Cedar Gap.
Wm. Brodbeck, Oregon.

An act of the General Assembly for 1893 incorporated the State Society, and provided for its maintenance. From its provisions no one can become a member except by paying into the treasury a dollar per year, or $10 to become a life member. The old rule adopted by the Society, that members of local societies are members, can no more be in force since the passage of this act. The Legislature gave the Society $2500 per year for two years' current expenses, and $2500 for publication of the report, limiting them to 400 pages, and of course the limit in number will be about 3500, when in reality we now need 6000 at least.

The plan to be followed in the development of the fruit interests and the fruit lands can be no better than the one followed for the last few years. The organizing of local societies over our State is one of the very best means known. Creating an interest not only in fruit and flower-growing, but in fruit-eating is one of the plans for us to follow. Our people are becoming more and more a fruit-consuming people, and they are calling for more fruit of all kinds, cheap fruits and plenty of them.

Our work first is to grow plenty of the very best of fruits, to pack them well and evenly, to find markets for their disposal, to induce our transportation companies to transport them cheaply and quickly, to study our locations for special fruits from special soils, to choose proper varieties for the market we are to reach, to care for our orchards, vineyards and fruit plantations, as we care for our other business matters, to ward off the insects which spoil our specimens, to fight the rusts, mildews, blights, bacteria and fungi of all kinds, and know how to do it properly; to pack judiciously, sell correctly, to increase the love for home and yard-planting, to beautify our lawns, to shade our highways, to plant our parks and cemeteries, to lay out drives and boulevards and parks, to increase the value of our green-houses, and the use of plants in our houses, our yards, our parks, to know how best to grow these for the great public; to grow better vegetables in our hot-beds, in our gardens, to improve what we have and grow new varieties, to propagate correctly all our fruit and ornamental trees in our great nurseries, and to give them to the people in good condition; above all, to breed new fruits and hardy ones as we do our cattle, to feed our trees, as we do our hogs, for a certain purpose, and then to learn to be sure of results of crosses and hybridizing, and we will have enough to keep us busy.

The fruit crop of the year has not been one to delight the hearts of the fruit-growers. Thousands of young orchards six, seven or eight years old have had no fruit, while their owners were so seriously wishing that they would only bear this year. But the epidemic of fruit-blasting was so general all over our country that we cannot complain. Like the general spread of the "epizootic" or the "grippe," it has spread over our land, and it is only the exception that we find an orchard bearing well anywhere in the western country.

The apple crop fell lower the past year than at any time to our knowledge in 25 years—not more than 10 per cent of a crop from the State as a whole.

The peach in the central and northern part of the State has been one of limit only by the trees. Wherever we found a good, healthy young peach orchard, there we found the trees loaded, but in the south and west of the State, where the orchards are numerous, there the spring blast destroyed them. The State gave 30 per cent of a peach crop only.

The cherry and plum crops are in the same list, and 33 per cent is the limit.

The pear, like the apple, will run down as low as 20 per cent.

The grape has been an abundant and perfect crop; in fact, no year has seen a better, and where well-managed and cared for, they have returned money to the owner.

The blackberry was also a very abundant and perfect crop, and returned their owners dollars for their care.

The raspberry and strawberry can only be reported as a half crop, and yet prices have been well maintained and paid well.

We may be sure that this is no time to neglect our orchards, or vineyards, or berry-patches. If there ever was a time when it was necessary to give close attention to business, now is the time. We may be sure that only the person who watches closely, acts quickly and studies correctly is to be the successful orchardist of the future. In this time of wreck and ruin in so many different walks in life, we can see the fruit-grower holding his ground and his home, by the strictest economy, perhaps, but much more successfully than any of the other trades of business or profession. We have no need, therefore, for discouragement, even if we have made no money to speak of this year on our fruits. A strict attention to our work, a study of the principles which underlie the subject, a lesson to be learned from experience, although dear, will help us make a success of what we do in the end.

Spraying is one of the most important matters now before the fruitgrowers. Experiments so far show that the best fungicide is the modified Bordeaux mixture: copper sulphate, two pounds; lime, two pounds; soap, one pound; water, 40 gallons; add, for insects, Paris green, two ounces for apples and one ounce for peaches and plums.

We are on the right road to find the best use to put these to. Our experiments are proving to us each year that there is something to learn yet. One may get a mixture that will burn the foliage, while another will claim that it is not strong enough to accomplish any good at all. Some parties last year injured their trees very badly by using the formula just as given by the Department. We must test these remedies of our own mixing before using.

I wish to call your attention to the use of tobacco for this purpose; it is a much better use for it than to smoke, chew or snuff it. There is no simple remedy that the insects dislike so utterly as tobacco. It will kill or drive away most of our injurious insects, and will not injure the leaves of our trees or plants. I have not tried it for the codling moth, or the scale on the raspberry, or the curculio, but it occurs to me that it will keep them away, as I know it to be so beneficial in our green-houses and on our plants.

The Farmers' Institutes which are now being held over the State are some of the good plans to scatter information. In the arrangements of dates from Nov. 12 to Dec. 22, and at 26 different locations, we have and will have Mr. Murray for Northwest and Northeast, myself for Western, Mr. Nelson for Southeast, and Mr. Evans for Central and Southwest Missouri. The series coming during this meeting will be attended by one of our prominent members of South Missouri who could not be present with us, Mr. Z. T. Russell. Many a good word is spoken, many an experience given, many a seed dropped that will help our fruit-growers in their work. We hope this may be increased so that there will be 126 instead of 26 localities where these institutes are held.

And now, dear friends, at the close of another year's work, have we learned anything from our failures of the past year? Have we, from the teachings of nature, any facts to rest our hopes upon? Will we act with all the light we have? Success or failure is of no permanent use to our cause if we learn nothing from them. But to my mind it has settled this one fact: that the future of fruit-growing depends upon diligent, earnest, intelligent, enthusiastic, business-like methods. Let us make the future as bright as we know we are able, taking a united stand, helping one another, advising one another, and we may be sure that we will see our efforts crowned with success.

LIST OF MEDALS

Awarded at the World's Fair—1893.

STATE HORTICULTURAL SOCIETY, WESTPORT—
Awarded for display of Peaches.
Awarded for display of Apples of 1891.
Awarded for display of Apples of 1892.
Awarded for display of Apples of 1893.
Awarded for display of (200 jars) Vegetables in solution.
Awarded for display of (1000 jars) Fruits in solution.

OLDEN FRUIT CO., OLDEN—
Awarded for display of Stone Fruits.
Awarded for display of Apples.
Awarded for display of Pears.
Awarded for display of Crab Apples.

S. W. GILBERT, THAYER—
Awarded for display of Peaches.
Awarded for display of Apples.
Awarded for display of Pears.

N. F. MURRAY, OREGON—
Awarded for display of Apples.
Awarded for display of Pears.

GEO. A. DEITZ, OLDEN—
Awarded for display of Evaporated Prunes.
Awarded for display of Evaporated Peaches.
Awarded for Fruit Evaporator.

OREGON CANNING CO., OREGON—
Awarded for display of Tomatoes in cans.
Awarded for display of Corn in cans.

WIRT & KNOX MANUF'G CO., INDEPENDENCE—
Awarded for display of Tomatoes in cans.

I submit a few complimentary notices of our last report:

LEAVENWORTH, KAS., August 23, 1893.

Mr. L. A. GOODMAN, Secretary Missouri State Horticultural Society:

DEAR SIR—Through your kindness, I am in receipt of your 35th annual report, and an excellent and instructive one it is.

What a development you have created in Missouri. What a noble body of men and women you have enlisted and working in horticulture. The desire to share the society of your intelligent, wide-awake workers makes one almost wish he was a citizen of your most favored State. It seems to me that you are bound to push the old State to first place. I trust the State will appreciate your work and reward you accordingly.

Yours very truly,

E. J. HOLMAN.

GREENSBOROUGH, N. C., Dec. 29, 1893.

To the Commissioner of Agriculture, Jefferson City, Mo.:

DEAR SIR—In a recent letter from the Agricultural department, Washington, D. C., reference is made to your State Horticultural Society's report, which contains valuable information as to the propagation and cultivation of the raspberry. If it is possible, I should like to obtain this report. If you are not the proper party, will you please put this in the hands of the gentleman having the matter in charge, and oblige

Yours truly,

E. J. FORNEY.

ST. ANTHONY PARK, MINN., Nov. 24, 1893.

L. A. GOODMAN, Sec'y Mo. Horticultural Society:

DEAR SIR—It is with much interest that I note the subjects for discussion at your next meeting. The past season has certainly been a hard one for fruit-growers. I think we must in the future pay more attention to methods of culture. The use of the mulch and the spraying machines is going to do much to help us to a greater certainty in raising fruit-crops. I trust that it will be a long time before we have such a season as the past.

Trusting you will have a pleasant meeting, I remain

Cordially yours, SAMUEL B. GREEN,
Prof. Horticulture.

THE WORLD'S FAIR.

E. L. POLLARD, CAMERON, MO.

Having been in the employ of the Missouri State Horticultural Society at the World's Fair, Chicago, for six months, in the interest of the State, it is perhaps proper that I should tell you of some of the things that interested and impressed me in the work in hand. It might be well for us, in looking back at the display made by us at the Fair and comparing it with the rest of the world, to remember that the territory that we represented there was only one three-thousandth part of the territory supposed to be represented; we will understand, therefore, that Missouri is not the only spot on the face of the earth; neither is it the only place where fruit is grown.

This idea evidently pervaded the New England gentleman's mind with regard to his own state, who, on examining our exhibit and observing its attractiveness, remarked, "I declare, I did not know they raised fruit in Missouri." Still, Missouri is not the only state or country that produces apples. We had displays of apples side by side from the hills of Maine, the sunny slopes of California, from the virgin State of Washington and from the sunny fields of the Carolinas; the plains of Russia, in the far north, and the golden shores of Australia, in the far off antipodes.

It was interesting to note the peculiarities that marked the apples from the different sections of the country as well as those from foreign lands. There was the State of New York with her long list of old varieties, such as Kings, Baldwins, Spys, Newtown Pippins, etc.; and it was noticeable in their display that there was a lack of bright colors in their apples. So many of them were of a green or dull-red color.

Wisconsin came forward with a fine show of her Russians and Russian Seedlings. Lubsk's Queen, Wealthy, McMahon's Bloom (McMahon's Red, as it is sometimes called), Alexander and Wolf River were the most promising varieties. For their delicate coloring and their soft, clear, waxy appearance, as grown in northern latitudes, these Russians certainly carry off the palm of beauty. But, living in a country where such varieties as Ben Davis, Willow Twig, Jonathan and Gano grow almost spontaneously, we have but a passing interest in those iron-clad varieties that grow in the far north.

If we would anticipate the appearance of the coming apples, those that are to take the place of our now standard kinds, we should turn our faces in the other direction and look toward the sunny peaks of the Ozarks, for there is where they are to come from.

The states of Idaho, Washington and Oregon made a good showing of apples, and together formed a group having particular markings and peculiarities. First, it was noticeable that their fruit was comparatively free from insect blemishes and scab, which is true of all new countries, as you can see by the fruit right here on our own tables. Those specimens grown in the southern and newest sections of our State are the most perfect, but it is only a question of a few years, unless incessant war is waged against the codling moth with the spraying pump, until all portions of our country will be subject to the ravages of these destructive insects.

The varieties grown in the northwestern states mentioned were of the old eastern types, Spitzenbergs, Newtown Pippins and Greenings, and it seems that the green and yellow apples are the most profitable and popular with them. The Ben Davis has been tried there, but is not popular; neither is the Jonathan. When it comes to quality, it does not require an expert to decide between the Missouri apples and the apples from the states mentioned. We have yet to see the first apple grown under irrigation and pumped full of water, that will equal a good old naturally grown and ripened Missouri Jonathan. You cannot find them, for they do not grow. We have had the pleasure of cutting and tasting some of the finest specimens of Yellow Newtown Pippin and Esopus Spitzenberg, grown in the State of Washington. I must say that they have not the flavor or quality of a well-ripened Missouri Ben Davis. And you all know that if you cannot find quality in a Yellow Newtown or an Esopus, there is no use hunting any farther for it.

I am here reminded of an incident showing what some people's ideas are of the quality of our apples. Two men were passing through the exhibit, when one remarked: "This is Missouri; pretty good show." And the other answered: "Yes; they make a pretty good show, but their apples are so corky." Well, I wondered where he "had been dug up," and I had the face to ask him, and he said York state. I guess that was the first time he had ever been west. Of course, we get a good many compliments like that, but like the boy that was kicked by a mule, we just consider the source and let them pass. It was a very amusing pastime to sit and listen to the remarks of visitors as they passed by. Some of them I noted down, thinking they would make interesting reading.

I remember an elderly gentleman who came down the aisle of the Horticultural building, not paying any particular attention to the exhibit as he passed along until he came to Missouri, and then he looked. He went on a little farther and it was Missouri, and farther, and it was still Missouri, and by that time he had gotten to the end of our display. He turned around and looked at it and uttered what I believe was the honest conviction of his heart. He said to the rest of his party: "That is pretty good for old Missouri." But while there were those who were prejudiced, narrow-minded and selfish, it was a satisfaction to see that the great majority of World's fair visitors were looking for the truth. They were there to learn what they could do—were willing to bestow praise and credit wherever it was due.

The Missouri fruit exhibit was an eye-opener to millions of northern and eastern people, who never knew of the marvelous resources of this grand State. To others who knew of our resources as a fruit state, they said: "This is just what we expected." Take Missouri's exhibits as a whole, in all departments, and where is a state that made better for the amount of money spent, or that will reap a larger harvest for her efforts?

Our fame has spread all over the civilized world, even to the islands of the sea. We were shown an article published in a Sidney (Aust) paper in which the writer attempted to correct an erroneous impression current in that country, to the effect that the fruit region of the U. S. was limited to California, and a strip along the Atlantic coast. He says, "right in the very center of the U. S. on the hills and plateaus of the Ozarks is grown the king of commercial apples, known by the name of Ben Davis." He was very loud in his praise of the Missouri apples, as to their beauty, high quality and long-keeping qualities. The Australian fruit-grower, you will bear in mind, harvests his apples in March or April, just the time we have none. Just how this will affect the American and English fruit growers when they get to growing in large quantities, which we understand they are preparing to do, is hard to tell.

It may be that we will then have no use for cold storage, and that some varieties of our apples which have nothing to recommend them but their keeping qualities will be dropped from the list. We will not, however, cross the bridge before we get to it, but will go right along planting Ben Davis by the hundreds and thousands of acres, and keep on planting until the world says, "hold, enough" Still, while we are busy planting our Ben Davis, we should not be oblivious to the varieties which have a just claim upon our attention.

The finest and largest collection of new varieties of apples that was on exhibition was shown by the state of Arkansas. They had in their collection 67 new seedling varieties, and the remarkable feature about it was that they were all good. They had qualities about them that would make them popular, and for beauty would compare with any collection of varieties to be found anywhere. They were a crop of seedlings, as you might call them, and in the one lot, as good a collection of apples could be made as by picking out an equal number of the best varieties produced in the last 50 years.

I will call your attention to a few varieties in particular. The Ingrahm, known to most of you, though comparatively new, has qualities about it that will recommend it to every orchardist. Gill's Beauty (No. 49) is very good and promising. Arkansas Beauty (No. 65) is another good one, and also the Ozone. Nos. 1, 2, 4, 7 are especially promising. They are known only by number, never having been named and described and their history written, as far as could be learned by Prof. J. T. Stinson of the Horticultural department of the Arkansas Experiment

Station. He has in course of preparation a bulletin on new apples, which will be a valuable addition to our horticultural literature.

All these new seedlings have been numbered, and will be known by number until they have been thoroughly tested.

Another promising seedling is a beautiful red apple from our friend S. W. Gilbert of Oregon county. You will find specimens of all these varieties mentioned on exhibition here, and can examine them at your leisure.

Our entries at the World's Fair included 722 varieties of fruits and vegetables preserved in glass jars, 4744 plates of fruit preserved in cold storage from 1892, and 5705 plates of the fresh fruits of 1893, besides evaporated fruits and canned goods.

To look at our exhibit of fruit, as compared with the rest of the world, one would be led to believe that we occupy a very important place among the states and nations of the world, and so we do. As one visitor expressed it, "seems like Missouri is taking more than her share in here." True, we had a large display—the largest general display, all things considered, space covered, length of time kept up, variety, etc.—made by any state except California. Of apples alone we showed as many as any other two states combined.

STATE HORTICULTURAL SOCIETY.

Editor Rural World: As the time approaches for our winter meeting, the prospects seem bright for a good meeting, I am sure we will be delighted to see many new faces from all parts of the State present with us. A great deal is to be learned by thus meeting together, and we always find some one at these meetings that knows more on some points than we do. The editorials in the Rural were well timed and well said. The more we study our work and discuss these matters, the more we think of our calling and the better we are able to cope with the adverse trials of fruit-growing. Your appeal to the fruit-growers to make this the rallying point of our work and experience is a good one.

The report of our display at Chicago will be an interesting one, the criticisms on it will be still more interesting, and the discussion of the management, the jury, and the plan of awarding, still more so. Our exhibit there secured 19 medals during the summer, and we are well pleased with what has been done. There never was a day when we did not have on our table 300 to 400 plates of fruits and 1000 to 1200 jars of all kinds filled with all the fruits that grow in Missouri. No one state had such a supply of apples on the tables every day of the six months as we had. Many of the states had nothing on their tables until apples began to come in July, and then only a small amount.

I say that we are well pleased with our exhibit during the whole of the summer, in spite of the very scarce time for beautiful specimens. In no year could it have been so hard to secure good specimens, and no time could have been chosen when we could not call upon our fruit-growers about the State and get all the fruit we could put on the tables at any time. But where we had placed our greatest dependence for a large collection of varieties, the severe season destroyed our prospects. Many of our members could and would have gladly sent us a large collection, but they were not to be had in their community. Still, with all these drawbacks and hindrances, we have had on our tables as fine a lot of fruits as could be collected, and feel proud of our display.

I am sure that there was no more artistic display, nor a more complete one, than the one from Missouri, both from an educational standpoint and as a collection and display of fruits. The range covered by the display was the whole range of fruit-growing from one year to another, leaving no time in the whole year but that we might have fruits on the table by following the list there shown. From early in May, when the strawberry begins in South Missouri, to the last of October, when the last of the apples are put away (apples that will last until berries come again), we have had a complete succession of fruits—strawberries, raspberries, apricots, nectarines, peaches, pears, plums, quinces, grapes and apples, in variety so as to fill the entire time full.

I cannot help mentioning one helper in this collection, because he has done so much more than anyone else in the State—S W. Gilbert, of Thayer, Oregon county, Mo To him is due the honor of making the best display from any part of our State, and Oregon county stands far ahead of any other portion of the State in the large and collective display of berries, peaches and apples. May the county authorities of his county give him the honor due him, and may his city accord to him all the praise and glory the county has secured.

There was no time during the whole of the peach season, nor apple season either, but that Mr. Gilbert had on the tables a fine collection—the finest collection of peaches and apples that our State had on exhibition.

I do no violence to the other good men who have so nobly stood by this work, and we accord to them the praise justly their due. I will make mention of each by name in my report to the Society, and they will get just recognition for all they have so nobly done.

The 19 medals awarded us is honor enough for one year, but we like not the medals because they have been given so promiscuously that they do not mean what we want them to say.

It is alike in all departments: every exhibitor gets a medal, and that medal does not even say what it is given for; if for a collection of apples, it does not say five plates or 500 plates. You will see by this that the medals show very little what was on exhibition. For instance, we have had on exhibition over 10,000 plates of apples during the six months, and we get *a medal of highest award for a collection of apples*, without mentioning the number of plates that collection consisted of; while another state gets a medal of the same kind for *a collection of apples*, when they had only 1500 plates during the whole six months.

No one gets a medal with the word "best" upon it, so that you will see there was no competitive display at all. We are all given medals of *Highest Award*, and I suppose we will be satisfied, but no one gets best.

Already, dear editor, I have drawn this out too long, and we earnestly invite you to meet us at Fulton, where we can discuss more practical matters concerning fruit-growing.

All our fixtures and jar fruits have gone to the St. Louis Exposition, there to be on exhibition for two years, according to the law of the land, but the Society has not lost its intereft in them. L. A. GOODMAN, Secretary.

AN INCIDENT.

While at Alton, in company with Mr. S. W. Gilbert, we were asked by Circuit Clerk Norman to step up into the court-room where the county court was in session. After an introduction to the honorable court and attendants, Mr. Felix Norman called the house to order and announced that the citizens of Alton desired him to present to Mr. Gilbert a silk hat and a gold-top cane as a mark of their appreciation of Mr. Gilbert's efforts at the World's Fair, whereby he had won first honors for himself and for Oregon county fruit.

Mr. Norman said: We desire this hat to cover the head that was wise enough to discover the soil that could produce such fruit, a mind so well trained as to know how to utilize the great resources of that wonderful soil, and direct those fertile agencies to produce fruit that was the wonder of the world, and unequaled by that of any other portion of the western continent.

Mr. Gilbert was, of course, just a little "out of breath," and when the hat was put on looked a giant in height. After a little composure, he replied as follows:

CITIZENS OF ALTON: Your kind expression of appreciation of my success is accepted in the same generous manner as given. I certainly should be thankful that friends do appreciate the efforts and labors I have put forth in the planting and growing of fruits in Oregon county, which has fully demonstrated that the sands of Maryland and Delaware and the far-famed and high-priced lands of the Pacific coast are literally "nowhere" in comparison with the cheap flint hills of Oregon county in the growing of choice fruits, and especially the most luscious of all, the peach.—"Rover" in Colman's Rural World.

"POOR OLD MISSOURI" DEPARTS A PROUD PRIZE-WINNER.

The first State prepared to move all its exhibits out of the Fair grounds is the fifth State in the Union—"Poor Old Missouri." To the credit of Missouri, too, it can be said that she was the first State to have all her exhibits on display at the Fair, and that, too, when she was represented in more departments than any other state or territory in the United States by exhibits in the Agricultural department, crops and wool exhibits, horticultural, pomological, floricultural, and had the largest herbarium on exhibition; live stock, fish, ornithological, liberal arts, educational; mines, commercial and scientific; machinery and transportation, in which there were individual exhibits.

J. K. Gwynn, executive commission, in speaking of "Missouri at the Fair," said yesterday: "The people are proud of the display the State made, and Missouri exhibitors proved prize-winners in the first degree."

Enumerating, Mr. Gwynn said the State had carried off the following among other prizes:

Sweepstakes on cattle against the competition of the world.

On Aberdeen-Angus cattle one Missourian took 9 prizes out of the 13 first-class prizes offered.

On Merino sheep, 50 out of 80 prizes, and 70 out of 100 on Berkshire hogs.

Sweepstakes were awarded for saddle horses.

And Missouri, showing all the mules exhibited, won every prize, and could have done it, too, according to Mr. Gwynn, "if the bars had been let down and every mule in Kentucky had been stampeded toward the World's Fair."

The Missouri exhibits, loaded on 20 cars, will leave for St. Louis in a day or two. There, by act of the Legislature, they are to be put on exhibition in the Exposition building for two years, after which they will be consigned to the museum of the State University at Columbia. This act of the Legislature has prevented Mr. Gwynn from contributing largely to the Columbian museum. He has, however, presented the institution with samples of St. Francois county lead, Jasper county zinc, and many fine slabs of Ozark onyx.—St. Louis Republic.

REPORT OF A. NELSON, TREASURER.

	RECEIPTS.		
1893			
June 1....	Draft from State Treasurer	....	$730 32
13....	" "	....	243 78
July 13.. .	" "	....	210 10
Aug. 21....	" "	....	203 96
Sept. 9....	" "	....	150 75
	Dividend from Nevada Bank	....	36 19
Oct. 7....	Draft from State Treasurer	....	284 36
Nov. 9....	" "	....	311 31
Dec.	Membership	....	24 00
	Total	....	2190 48
	DISBURSEMENTS.		
June 1....	Balance from June account	....	$4 29
	Express	$6 75	
	P. O. (April)	16 80	
	" (May)	20 27	
	Salary of Secretary for May	66 66	
	Warrant No. 217	....	110 48
9....	Osborne & Pitrat, printing bill	78 90	
	Scotford Stamp & St. Ce., printing	54 40	
	Warrant No. 218	....	133 30
12....	Premiums at Summer meeting, Columbia	14 00	
	A. Nelson, expenses	28 15	
	S. Miller, "	8 00	
	L. A. Goodman, expenses	25 55	
	Warrant No. 219	....	75 70
	N. F. Murry, expenses	25 80	
	J. C. Evans, "	20 00	
	Warrant No. 220	....	45 80
30....	P. O. bill	20 00	
	Express	1 94	
	Salary of Secretary for June	66 66	
	Warrant No. 221	....	88 60
Aug. 6 ...	A. Nelson, expenses organizing Crawford Co. Society.	10 25	
	Expense account	4 50	
	Warrant No. 222	....	14 75
	A. P. Grimshaw, agent Jefferson City, express	84 45	
	Warrant No. 223	....	84 45
	P. O. bill at Chicago	9 40	
	Express "	7 35	
	P. O. bill, Westport	11 35	
	Pictures of exhibit	10 00	
	Salary of Secretary for July	66 66	
	Warrant No. 224	....	104 76

Aug. 29....	Mrs. S. S. Booth, P. O. bill	$42 29	
	Warrant No. 225	....	$42 29
	Express on Reports	5 75	
	" "	21 50	
	" "	1 20	
	Salary of Secretary for August	66 66	
	Warrant No. 226	....	95 11
Sept. 4....	Express on fruit to Chicago	13 35	
	Warrant No. 227	....	13 35
19....	Express	3 70	
	P. O. bill	20 00	
	Warrant No. 228	....	23 70
26....	Adams Express Co , express on fruit	64 00	
	Warrant No. 229	....	64 00
30....	Fruits, and express from Kansas City	46 75	
	Salary of Secretary for September	66 66	
	Expenses of L. A. Goodman—		
	To Arkansas	12 30	
	Hotel	2 60	
	Trip to Thayer	6 20	
	Warrant No. 230	....	134 45
Oct. 2....	A. Nelson, expenses on fruit sent to Chicago	48 80	
	Warrant No. 231	....	48 80
	S. W. Gilbert, Thayer, apples for Chicago	50 00	
	Warrant No. 232	....	50 00
Oct. 17....	N. F. Murray, Oregon, expenses collecting and money paid out for fruit	97 45	
	Warrant No. 233	....	97 45
	S. W. Gilbert, Thayer, specimen apples for Chicago.	80 00	
	Warrant No. 234	....	80 00
	Paid for fruits from Kansas City	46 15	
	P. O. bill	10 00	
	Salary of Secretary for October	66 66	
	Warrant No. 235	....	122 81
	A. Nelson, Lebanon, expenses on fruits to Chicago	20 95	
	Warrant No. 236	....	20 95
	Tribune Printing Co., printing and boxing	58 50	
	Warrant No. 237	....	58 50
	Adams Express Co., express on fruits	35 75	
	Warrant No. 238	....	35 75
Nov. 6....	Adams Express Co., express on return from Chicago.	16 75	
	Warrant No. 239	....	16 75

Nov. 6	Tribune Printing Co., printing bill	$19 25	
	Warrant No. 240		$19 25
9	R. E. Bailey, Fulton, express on fruit from Chicago	15 75	
	Warrant No. 241		15 75
20	Mrs. Sophia Booth, P. O. bill	10 53	
	" " P. O. bill	24 34	
	Warrant No. 242		34 87
	L. A. Goodman, express	16 85	
	Scotford Printing Co.	6 50	
	Osborne & Pitrot Co	2 95	
	Trip to Chicago and expenses packing up	35 00	
	Salary for November	66 66	
	Warrant No. 243		123 96
	Scotford Printing Co., printing program	14 50	
	Warrant No. 244		14 50
Dec. 9	Expenses at Fulton:		
	L. A. Goodman	30 00	
	Miss M. E. Murtfeldt	30 00	
	J. C. Evans	23 00	
	R. E. Bailey	10 00	
	Sam'l Miller	10 00	
	N. F. Murray	5 00	
	Warrant No 245		108 00
	Expenses at Fulton:		
	A. Nelson	30 45	
	Premiums	19 50	
	Express cloth and paper	12 25	
	Stationery and P. O., A. Nelson	6 75	
	Warrant No. 246		68 95
	G. B. Lamm, printing and P. O	16 45	
	Warrant No. 247		16 45
	P. O. bill	35 15	
	Express	5 00	
	Expenses L. A. Goodman at Farmers' Institutes	20 00	
	P. O. bill.	25 46	
	Salary for December	66 66	
	Warrant No. 248		152 27
	Miss M. E. Murtfeldt, entomologist	20 00	
	Warrant No. 249		20 00
	A. Nelson, expenses at Farmers' Institutes	27 50	
	Z. T. Russell, " "	21 00	
	Warrant No. 250		48 50
	Total		2184 25
	Balance in treasury		6 23
			2190 48

FULTON, MO., Dec. 7, 1893.

MR. PRESIDENT—Your Committee on Finance beg to report that we have carefully examined the accounts of the Treasurer, and find them to be correct as reported.

N. F. MURRAY, Chairman,
S. W. GILBERT,
R. J. BAGBY.

Adopted.

Then followed the election of officers:

President—J. C. Evans, North Kansas City.

Vice-President—N. F. Murray, Oregon.

Second Vice-President—Samuel Miller, Bluffton.

Secretary—L. A. Goodman, Westport.

Treasurer—A. Nelson, Lebanon.

Places were submitted for meetings of the Society.

Trenton, Lebanon and Sedalia asked for the next winter meeting, and Columbia asked to be made the permanent home of the Society. After a lengthy discussion the whole matter of places for the next annual and summer meeting was referred to the Executive Committee.

COLUMBIA, MO., December 5, 1893.

L. A. GOODMAN, Secretary Missouri Horticultural Society, Fulton, Mo.:

DEAR SIR—A bronchial trouble prevents my being at Fulton this time. If, as a member of the Boone County Horticultural Society, though absent, I be entitled to a vote as to where the State Horticultural Society should make its permanent home, I wish that vote cast in favor of Columbia. At our last meeting a few weeks ago at Columbia, we voted unanimously in favor of Prof. Kurtz to represent us at Fulton in presenting Columbia's claims before the Society. If we do not win, I trust the Society will choose no other place until we can call a mass meeting at Columbia, if necessary, for the purpose of pressing our claims another time upon you. With the State Society meeting here often in June, he will be able to announce to you the beginning of an agricultural and fruit museum something like that in the Government building at Chicago, or at least one that will be worth a trip every year to see. I herein enclose you clippings from the "Columbia Herald" on the subject-matter of this letter, trusting that you will read them in connection with it.

Very respectfully yours,
THOS. L. BEAZLEY.

BOONE COUNTY HORTICULTURISTS.

At the last meeting of the Boone county Horticultural Society there was a good attendance and much interest.

The Society voted unanimously to do all in its power to make Columbia the permanent summer home of the State Society. As many members as possible will attend the State meeting at Fulton, December 6, 7 and 8. D. W. B. Kurtz will present the claims of Columbia there.

Regular meetings will hereafter be held at the Horticultural grounds of the University, through the kindness of Prof. C. A. Keffer.

This committee on program was appointed: Prof. C. A. Keffer, G. W. Burroughs and D. A. Robnett.—Columbia Herald.

WHY NOT COME TO COLUMBIA?

At the last meeting of the Missouri State Horticultural Society, a proposition was made to select a permanent home for the Society. At this home the summer meeting should be held—the winter meeting, as now, being distributed to different sections of the State. This proposition was unanimously approved by the Society, and had the meeting been held elsewhere than in this city, Columbia would have been chosen the permanent home.

The question will doubtless come up at the winter meeting to be held next month in Fulton. We hope the delegates from the Boone county Horticultural Society will go prepared to urge the invitation extended here on behalf of Columbia. The advantages to this city, to the University, to the Agricultural college, from the annual meeting here are too obvious to need enumeration. The Horticulturists are wide-awake, earnest, educated people, and their friendship is most valuable.

We can promise the Horticultural Society as hospitable welcome and as pleasant and profitable meeting as could be secured in the State. Let the Society make Columbia its home.—Columbia Herald.

REPORT OF CORRESPONDENCE WITH THE RAILROADS.

CHICAGO, Oct. 17, 1893.

L. A. GOODMAN, Esq., Westport, Mo.:

DEAR SIR—Referring to your letter of October 12, just received, requesting reduced rates for the Missouri State Horticultural Society, to be held at Fulton, Mo., December 5-7.

Please fill in the information requested on the enclosed blank, and return it promptly, that we may determine as to whether the proposition is one which can properly be submitted to our lines for vote. Under our rules, the granting of reduction is primarily dependent on the number in attendance, and we are required to have a reasonable assurance that there will be an attendance of 250 or more—exclusive of ministers or others holding half-fare permits or commutation tickets—traveling over lines in the territory of this Association, before we can properly submit for vote of our lines proposition providing for reduced rates.

In the event of unanimous vote in favor of granting reduced rate on certificate plan, such reduction, under our rules, can only be made effective where the attendance amounts to 250 or more persons, as indicated by certificates they hold, showing that they have paid full one-way rate on going trip, or purchased round-trip excursion tickets to the meeting point reading from or through our territory. If, on the other hand, the expected attendance from our territory is less than 250, it will not be practicable, under our rules, to grant the reduction, and therefore, unnecessary to submit proposition for vote. Respectfully,

B. D. CALDWELL,
Chairman.

In answer to this, I wrote the Chicago & Alton, the Missouri Pacific and the Wabash, urging the worthiness of our cause, and that it was impossible for us to secure the 250 persons, but that we were entitled to the rate by all means.

The following answers were received. I publish them, showing that the best efforts were made that could be made:

CHICAGO, Oct. 24, 1893.

L. A. GOODMAN, Esq., Westport, Mo.:

DEAR SIR—For your private information I enclose herewith copy of my letter of this date to Messrs. Townsend and Chandler, of the Missouri Pacific and Wabash, respectively, in which I endeavor to secure agreement with them to make straight rate of one fare and one-third for the round trip from points in Missouri to Fulton and return on account of your meeting to be held there December 5-7.

I will advise you result as soon as I hear from these gentlemen. In the meantime you may rest assured that we appreciate your courtesy and favor in selecting a point on this line at which to hold your meeting, and our best endeavors to secure you the benefit of the reduced rates, to which you are entitled, shall be yours.

Yours truly,

J. CHARLTON.

CHICAGO, Oct. 24, 1893.

F. CHANDLER, ESQ., G. P. & T, A., Wabash R. R., St. Louis, Mo., H. C. TOWNSEND, ESQ., G. P. & T. A., Mo. Pac. R'y, St. Louis, Mo.:

GENTLEMEN—The Missouri State Horticultural Society will hold their next meeting at Fulton, Mo., a local point on this line about midway between Mexico and Jefferson City, December 5-7, 1893. Their application to the General Association has been declined, as they are unable to insure an attendance of 250 or more.

As the Missouri Pacific, Wabash and Alton are the only lines interested, it has occurred to me that possibly we can agree upon a straight rate of one fare and one-third for the round trip from points in Missouri, tickets to be sold December 4, 5, 6 and 7, 1893, limited to return on or before December 8, 1893. What do you say to the proposition? Please advise.

Very truly,

JAS. CHARLTON.

ST. LOUIS, MO., October 25, 1893.

Mr. L. A. GOODMAN, Westport, Mo.:

DEAR SIR—I am in receipt of yours of 19th relative to Missouri State Horticultural Society meeting at Fulton, December 5 to 7, inclusive, and note what you state relative to Chairman Caldwell having refused to authorize special rates from the fact that there were not sufficient numbers who would attend. We cannot consistently name special rate and open our entire line in Missouri for this meeting, but will be willing to do the next best thing, which is, if you will send us a list of the points on our line from which you expect delegates to attend the meeting at Fulton, we will name them special rate of one and one-third fare to Mexico and return. The probabilities are that the C. & A. will name one and one-third fare from that point to Fulton and return.

Yours truly,

F. CHANDLER, G. P. & T. A.

CHICAGO, Oct. 28, 1893.

L. A. GOODMAN, Esq., Westport, Mo.:

DEAR SIR—Referring further to your favor of October 19, and my reply of the 24th as to rates for meeting of the Missouri State Horticultural Society, to be held at Fulton, Mo., December 5-7, 1893:

I have pleasure in advising you that both the Missouri Pacific and Wabash have agreed to our proposition to make rate of one fare and one-third for the round trip on the certificate plan from all points in Missouri. Our first proposition involved the making of a straight excursion rate of one fare and one-third for the round trip, and Mr. Chandler of the Wabash concurred in same, but advised that he will only apply the rate from such points on his line from which delegates would attend. He has later decided to make the rate on the certificate plan, and I assume that he will have no objection to applying that basis from all points on his line in Missouri. I have forwarded Mr. Chandler copy of this letter, with the request that he advise you direct, in addition to advising me whether he still intends to apply the rate from restricted territory.

Sample certificates will, no doubt, be sent you by the Missouri Pacific and by the Wabash in due course. Those for this company will go forward within two or three weeks before the meeting is held.

I am very much pleased at the success which attended our efforts to secure for your meeting the reduced rates to which it is entitled.

Yours truly,

J. Charlton.

St. Louis, Mo., October 31, 1893.

L. A. Goodman, Esq., Westport, Mo.:

Dear Sir—Reduced rates having been granted account of Horticultural Society meeting, December 5 to 7, 1893 (under the usual condition that there are in attendance at least —— by rail from outside points), I beg to enclose herewith several sample certificates, which I would thank you to sign with *pen and ink* and return to this office at your earliest convenience.

On receipt of same we will instruct our agents at St. Louis, Jefferson City, Marshall and Higginsville to return delegates to points in Missouri at one-third regular fare on presentation of certificate receipts properly filled out and signed by yourself in manuscript.

Under this arrangement, delegates will purchase tickets to any of the above points, paying full fare for same, and obtaining from agent at starting point certificate receipt for fare paid. This receipt, when properly countersigned by yourself at the meeting, and presented to the agent at the point at which our line was left on the going trip, will be honored by him for ticket returning to starting point, as above stated.

Please impress upon delegates the absolute necessity for their securing these certificate receipts on the going trip, as we will be unable to refund full fare paid returning through any misunderstanding on their part in this respect.

In order that they may be honored, certificates should be presented for tickets on the return trip on or before December 9. If it is found that the meeting will continue beyond this date, advise us promptly, in order that we may extend the limit of certificates. Yours truly, H. C. Townsend.

Chicago, Nov. 2, 1893.

L. A. Goodman, Esq., Westport, Mo.:

Dear Sir—Referring to previous correspondence as to proposed action in making reduced rates on the certificate plan to Fulton and return, account of meeting of Missouri State Horticultural Society to be held there December 5-7, I find that on account of objections raised by lines indirectly interested, it will be impracticable for us to make any reduced rates for your meeting, unless it is concurred in by the entire Western Passenger Association; and you are, therefore, advised that all arrangements looking to a reduction in rates for the meeting referred to are hereby canceled.

Yours truly,

J. Charlton.

ST. LOUIS, MO., Nov. 3, 1893.

L. A. GOODMAN, Esq., Westport, Mo.:

DEAR SIR—Referring to our letter to you of October 31, regarding meeting Missouri State Horticultural Society, at Fulton, Mo, December 5 to 7:

We are today in receipt of letter from General Passenger Agent Charlton, of the C. & A., withdrawing reduced rate arrangement over his line, and unless you can have the question taken up and agreed to through the Western Passenger Association, it will be necessary for us to also cancel arrangement for reduced rate, as explained to you in previous letter. Unless the line entering Fulton authorize reduction, nothing better than tariff can be made over our line for this occasion.

Yours truly,

H. C. TOWNSEND.

CHICAGO, Nov. 8, 1893.

L. A. GOODMAN, ESQ., Secretary Missouri State Horticultural Society:

DEAR SIR—For reasons already advised you, it will be impracticable for this company to make any reduction on account of your meeting to be held at Fulton, Mo., unless all lines in the Western Passenger Association concur in the arrangement.

I recommend that you correspond with Mr. B. D. Caldwell, Chairman Western Passenger Association, Rookery building, Chicago, advising him of the probable attendance, the territory from which delegates will come, etc. He will take the question up with all lines interested, with the view of granting the desired reduction in rates.

Were we privileged to act our pleasure, you could absolutely depend upon the rate of one fare and one-third for the round trip on the certificate plan; but as we are subject to heavy fines for violating any rule of the Western Passenger Association, it would be an unprofitable venture for us to assist you unless we can secure the consent of the other members of the Association. Yours truly,

J. CHARLTON.

CHICAGO, Nov. 17, 1893.

L. A. GOODMAN, Esq., Westport, Mo.:

DEAR SIR—We have your favor of Nov. 14, regarding meeting of Missouri State Horticultural Society, to be held at Fulton, Mo., Dec. 5-7, and note carefully what you state regarding same. The rules of this Association were revised on June 15 last, and the provision as to attendance for meetings such as yours was changed from 100 to 250. We very much regret to inform you, therefore, that the chairman is without power to waive or modify these conditions. Your meeting is certainly a very worthy one, and it is possible that were your members advised that, provided they could turn out 250, reduced rates would be granted, that you would be able to receive such assurances as would satisfy you that you would be able to turn out such an attendance, in which case we should be very much pleased to at once submit proposition providing for reduced rates.

Respectfully,

B. D. CALDWELL, Chairman.

THURSDAY, Dec. 7, 7:30 p. m.

At each of the evening sessions the Fulton brass band gave a number of pieces before the hall, and two selections in the room before the opening, which was well appreciated by the Society.

DISCUSSION.

N. F. Murray—I think we should make mention of what was done at the World's Fair. I spent three weeks there myself. You are aware that the State appropriated $150,000 to make an exhibit at the Fair. This Society secured the promise of $10,000 of that fund. Never at any time was there a single dollar set apart for our use. We had nothing to draw upon but our own pockets; we had to pay our own bills; when we needed funds we were informed that we would be allowed $2.00 per day to pay our expenses. Mr. Gwynn said in his opinion the State Horticultural Society was doing more to carry Missouri to the front than any other agency.

Messrs. Goodman, Pollard and Evans deserve great credit for what we have done. We were right up in the front rank. We took 19 medals on our fruit, and the State took 400 medals, which is more than those of any other State. It should be the ambition of every citizen of Missouri to make her the highest and grandest in the bright galaxy of States.

J. C. Evans—It is but justice to Mr. Gwynn to say that he was not one of the State's World Fair commissioners. He had to obey orders and carry out the instructions of his superiors. The Governor appointed the commissioners. I think Mr. Gwynn was the friend of the State Horticultural Society, but he was handicapped. He could not do as he wanted to. About June, some of the funds set apart for certain interests had been expended. They then put all the money into one fund and stinted everything just as much as possible. We had to pay money out of our own pockets. While I think we were treated unfairly, I don't want to get up a fight.

Mr. Kurtz—Was the $150,000 all expended?

J. C. Evans—I am not prepared to answer that question. I could never get an intelligent account of how the money was expended.

A. J. Blake—The State Poultry Association say they never received a penny.

J. L. Erwin—The State Dairy Association failed to get what had been promised them.

J. C. Evans—The one great mistake we made was in not requiring all the money in our hands before we began a bit of work. We have now men who have paid out money from their own pockets, as ordered by the chief of our division over six months ago, and not returned to them yet. The Horticultural Society has had to pay many bills which the Commission should pay back to them. It is provoking enough to be compelled to give your time without pay, but when you are compelled to pay out your own money and have to wait and wait and wait, it is no joking matter. Every one of these bills should be met and paid at once.

Insect Friends and Enemies.

BY MISS MARY E. MURTFELDT, KIRKWOOD.

The agriculturists and horticulturists of this great State, as a whole, do not know enough of this estimable lady and the excellent work she is doing and is capable of doing for them and their industries. We have long thought that were she in the employment of the State, and her whole time devoted to its service, and to the service of those whose money, labor and time are being lost by depredations of the innumerable insects that abound in orchard, garden and farm everywhere and always, it would be the means of saving millions of dollars to those who make their living out of the crops produced from the soil. To the address here given we invite the careful attention of the reader, assuring him that it is written by one master of her profession for their good, and not with any vain-glorious idea of appearing in public or in print:

INSECTS IN WINTER QUARTERS.

One of the prominent features of the warm season in temperate climes is the prevalence of insects. Air, earth and water fairly teem with their diverse and adaptive forms, and the soft air rings with the peculiar notes they furnish to nature's symphony.

In the flower garden, at noon-day, dainty and graceful butterflies by hundreds flit from one nectar cup to another, and when refreshed with sweets, whirl in airy dances above our heads and disappear over the fields, to be replaced by others no less lovely and no less agile. Bees, too, large and dignified, velvet-robed and shod with fur, armored wasps and gaily-banded flies, fill the air with a harmony of blended tones that seem to fitly votalize the light and heat. Near bodies of still water, filmy clouds of mosquitos and other gnats rise in the air, the winged atoms circling, dancing, singing, and also, alas! stinging, their close ranks cut ever and anon by swift-darting mosquito hawks or dragon flies, which, with raised masks, engulph them by hundreds in their capacious mouths.

If we cast our eyes downward, we behold gleaming beetles and other predaceous forms coursing swiftly over the ground, or slyly lurking at the bottom of pitfalls of their own ingenious construction, ready to pounce upon any unsuspecting larva or venturesome ant that may cross their pathway or fall into their traps. As the midsummer night comes on, from every tree-top resound the deafening drums of the cicadas, whose noisy chorus is followed by the recitative of the katydids to the accompaniment of the whirring of tree-crickets and orchilinums; a fusilade of clumsy nocturnal beetles beats against our lighted windows; pale, broad-winged moths flit ghost-like in the moonlight, while wierd-looking mantes find entrance through some unguarded window or door, and startle us by suddenly alighting upon our shoulders or upon the table beside us, and regarding us with head askew and goggle eyes in a way to quite upset sensitive nerves.

Nor are insects simply contributions to the sights and sounds of the season. Tiny as they are and individually insignificant and ephemeral, collectively they are most potent for annoyance and destruction. Close watch must the orchardist keep on his trees, that borers do not weaken the trunks and cut off circulation of sap, that caterpillars and grubs do not devour the foliage, or worms corrupt the fruit. The waving grain-fields and meadows are menaced by scores of insidious destroyers, and even at times by those who attack in boldly marching armies. The herds are tormented by bot-flies, gad-flies and horn-flies from "morn till dewy eve," and even then certain species do not intermit their irritating pricks. Neither in the house are we exempt from care and loss of their occasioning. Windows and doors must be screened from the swarms of house-flies and the mosquitoes; the pantry guarded against incursions of fruit flies, meat-flies and marauding ants; the sinks baited for cockroaches, and the contents of closets and store-rooms frequently unfolded, shaken and medicated to preserve them from the gnawings of clothes-moths and *dermestes*.

Such are a few of the ways in which insects for more than one-half of our year become an important factor in the cares, labors, losses and discomforts of human life, as well as contributing some small share to its æsthetic gratification. But as the midday sun recedes from the zenith, the carnival of hexapod life becomes less gay, the drums of the harvest flies cease to reverberate through the purple twilight, and only a few katydids croak their iterations through the midnight hours. Presently on some clear night Jack Frost makes his debut, and before his presence the insect tribes vanish, as by magic, from sight and sense. We can hardly at first accept the change, so still are the starry nights, so unshadowed the noonday sunbeams. And have all these myriads miserably perished? Do we find their varied lifeless forms beneath our feet as we visit our dismantled gardens and leafless groves? By no means. Rarely indeed do we find an improvident bee or a stiffened butterfly clinging to a frozen flower. They have all been cared for by nature's kindly providence, and in what quaint and curiaus caskets, in what secure retreats and unsuspected shelters she has hidden them is her secret, but a secret that she will not withhold if we persistently urge its revelation.

The preparations for hibernation among insects are as varied as are the forms and habits of the different species. In every case compactness and inconspicuousness characterize the method. As life in the great majority of plants survives the winter only in the form of a tiny seed, so the embryos of a vast number of insects are impervious to the cold and dampness of the winter months, within the metallic or varnished cases of thousands of beautiful and peculiar forms of eggs. In this form the acme of vital condensation is achieved. A large number of insects, especially in the order in which transformation is complete, hibernate in that peculiar mummy-like form which entomologists designate as a *pupa*, which is protected by a silken or papery cocoon, or is buried deep in the earth. Those approaching nearest these in habit are species which, upon the approach of cold weather, having completed their larval growth, enclose themselves in cells or cocoons, and in a dormant state await the revivifying influences of spring before entering upon their metamorphoses. A very considerable number of insects brave the winter in their perfect or final form, in a state of such profound torpor that they are not only insensible to cold, but can with difficulty be aroused to unseasonable activity by artificial heat. Certain species of caterpillars and young grasshoppers have such adaptable constitutions that they do not mind being frozen until they are as brittle as an icicle, and if they escape being broken, will thaw out in the spring, begin feeding with great voracity, and complete their life cycle without experiencing any ill consequences from the boreal interruption to their development.

All the social hymenoptera, such as bees, wasps and ants, as well as many solitary species of these groups, hibernate in their perfect form: that is, the females do. Nature is rather hard on the males, granting them but a brief span of life during the autumn, after which they are suffered to perish.

The large, enclosed paper nests of the bald-faced hornet (*Vespa maculata*) would seem to offer a fairly comfortable winter home for the insects, but we soon learn that these are for summer use only. Indeed, they are the scene of a mimic tragedy every year upon the advent of cold weather, for as soon as the first frost falls, such of the wasp larvæ or pupæ as are still in the cells are dragged out, stung to death and cast upon the ground, and the perfect insects, which so tenderly cared for and fed their young for so many months and builded so paitently on the walls and galleries and cells of their ingenious home, now sail away remorselessly in the Indian summer sunshine to look up a very different retreat for winter—most content, apparently, if they can find entrance through an attic window, so that they may hide behind the rafters or near the chimneys. Ants retire to the lower or inner galleries of their formicaries and become torpid like the wasps. They are the only insects, except the honey-bees, which continue from year to year in the same location, unless the colony is by some means broken up. If we wish to find them we have only to dig deeply into some little mound where we have observed their activity during summer, or to strip the bark from a rotting log or stump, and we shall see them reposing in groups in the narrow galleries which they had previously carved or excavated with their jaws.

Many of the solitary bees creep into the hollow stems of weeds, or pass the winter as pupæ, in silken or waxen cells securely hidden in some cavity or aperture. A friend recently sent me the contents of a door-lock which had refused to "work," and was found to have every space packed with the little thimble-shaped cells of the Leaf-cutter bee—the cells being formed of round and oblong sections of clover leaves, placed layer upon layer, and containing each some fragments of bee bread and a round, silken cocoon within which reposed a bee pupa.

Parasitic *Hymenoptera* for the most part shelter during winter within the body wall or cocoon of the insect they have destroyed. The vegetable feeding species of this same order, the saw-flies and gall-flies, are mostly found at this season in the larva state, protected within earthen cells, or embedded in little pits in the substance of the unnatural growths which they cause on trees and shrubbery.

The house-fly, as we well know, will, in spite of all our precautions, contrive to find a warm corner indoors, and, on sunny afternoons, comes out of its seclusion to greet us with a lively buzz and to take a peep from the windows at the outer world. The blue-bottle and other meat-flies and most of the larger *Diptera* hibernate in similar fashion. So also do mosquitoes, but these do not reveal themselves until we find ourselves persecuted by the "May mosquitoes," which are often for a few days unseasonably annoying.

Butterflies and moths have a great variety of winter quarters. The swallow-tailed butterflies and their allies, the clover and cabbage-feeding species, are at this season packed away in their casket-like chrysalids, and so carefully are the latter hidden, and so imitative are their colors, that we search for them almost in vain. If we place during autumn pieces of bark or decayed wood or boards, slightly elevated from the ground, between our cabbage or celery rows, we shall probably secure some chrysalids of the butterfly larvæ that infest these plants. Most of the so-called four-footed butterflies hibernate in the perfect state, sheltering under the eaves of buildings or in hollow trees, where, with their velvety wings folded and bodies stiffened, they pass into a four or five-months' trance, during which respiration, circulation and all vital functions are suspended. None of the butterflies, so far as I have studied their habits, hibernate in the egg state. Many moths, on the contrary, do; among which we may enumerate the silk-worm of commerce, the Apple and Forest-tree Tent caterpillar, whose bands of eggs are often quite conspicuous upon the leafless twigs; the destructive Bag-worm and the Tussock moth But with this division of the *Lepidoptera*, the favorite winter form is that of the pupa—if above ground, enclosed in a thick cocoon; if subterranean, in an earthen cell, formed from particles of the earth, moistened with glutinous saliva from the mouth of the larva, or simply compacted by the contortions and twistings of the latter before its transformation. The cocoons of moths are, by a mysterious instinct, protected from birds and other enemies in various ingenious ways—devices which the birds have, in some cases, however, learned to fathom or overcome.

The large bag-like cocoon of *Cecropia* is often seen fastened longitudinally to some terminal, upright twig—the insect apparently relying on the difficulty of access to and the density of the many silken layers of its cocoon for the preservation of its pupa from attack—a reliance that is often misplaced. The more slender and smooth cocoons of *Promethia and Luna* depend from the tips of slender twigs by bands of silk several inches in length, while *Polyphemus* deftly hides its cocoon in the midst of a bunch of webbed leaves. Many small larvæ adopt the latter method of concealment, and are only detected by practiced eyes. That arch enemy of the pip fruits, the Codling moth, you will find at this season of the year enclosed in flat, papery cocoons, under loose scales of bark, among the fallen leaves in the forks of the trees, in the crevices of apple barrels and other nooks in the cellar, and even between the leaves of some of your books if it is your habit to bring dishes of fruit into your library or sitting-room. Upon tearing open one of the cocoons the only too familiar "worm" will be revealed, as yet unchanged, and not so torpid but that it evinces much discomfort at your intrusive curiosity, and is quite capable of repairing the rent in its covering if given the opportunity to do so.

The majority of the predatory and ground beetles, as well as many leaf-feeding species, pass the winter in the perfect state among fallen leaves, bits of bark on the ground, in crevices of walls or buildings, under loose bark of trees, and in dozens of other situations in which they are comparatively safe. All the boring beetles, whether partly or fully grown, winter over in the larva state in the tree they infest, usually in especially prepared cells cut deeply into the wood.

In the group of the true bugs, the advent of cold weather finds most of them in their winged form, and they also, before yielding to the drowsy influence of cold, hide among fallen leaves, in corn stalks, grain stubble and garden rubbish, where they are not incommoded by vegetable decay or any moisture short of entire and prolonged submergence. It is in such situations that the destructive chinch-bug, squash-bug and Harlequin cabbage-bug now lurk, and in which they should be sought and destroyed.

Very few insects of the Grasshopper family, or of the jumping *Homoptera*, hibernate in any except the egg state, reduced as it were to their lowest denomination. The tree locusts, or grasshoppers as they are properly termed, for the most part provide for the continuance of their kind by burying their sacks of eggs from one to three or four inches under ground. The *Orchilinums* and tree crickets make very characteristic punctures in the stems of weeds and soft-wooded plants, in which they place their eggs. Most of the katydids also conceal their eggs in the bark of trees, or between the cuticles of leaves; but the angular-winged species, which is the most abundant in this State, places its large, oval, slate-colored eggs over-lapping in a double row, glued to the side of a twig. These are often discovered on the twigs of fruit-trees and shrubbery, and never fail of exciting much interest and curiosity. The Buffalo tree-hopper makes a row of conspicuous little crescent slits in the twigs of the apple tree, in each of which an egg is found.

The new terrestrial *Neuroptera*, which include the lace-wing flies and ant lions, hibernate as pupæ stowed away in round silken cocoons, which are so small in comparison to the broad-winged insects that issue from them in the spring, that it seems incredible that the latter could ever have been contained within them. The aquatic members of this order, such as the dragon flies, stone flies, ephemera and the like, all winter as larvæ, in the element in which they breed.

There is a practical side to this subject, and as an economic entomologist, I am constrained to point it out, although it may seem like an impoetical way, to put it mildly, of using our knowledge of the mysteries of nature. Many of the insects mentioned are in the highest degree destructive, and the numbers of these can, in many cases, be most successfully reduced by searching for them in their winter retreats and destroying them by burning, or by the application of caustic liquids, or in other ways that seem convenient. Thus it will be seen that by burning the stubble of corn or small grains in fields where chinch-bugs abound, and also carefully clearing all rubbish from the fence-corner, we destroy the progenitors of legions of the pest. The eggs of tree-hoppers, bag-worms, tent caterpillars and tussock moths can be far more readily found and destroyed during winter than at any other season. The same is true of the cocoons of codling moth, of the egg-filled scales of bark-lice, of the twisted cases of the leaf-crumpler, and dozens of other species, while plowing late in autumn and early in spring will throw out and kill the eggs of grasshoppers, the fragile cocoon of the canker-worm and many cut-worms and saw-flies.

From a sentimental point of view this seems in some sort a betrayal of nature's confidences, and very like taking an unfair advantage of defenseless creatures, whose marvelous instincts are sufficient to guard them against all dangers except the curiosity and ruthlessness of man. But our crops, our herds and our persons must be protected against the undue multiplication of forms which, were it not for the disturbing influence of human enterprise and necessity, would never appear in such disproportionate and ravaging numbers. And if there is any consolation in the reflection, we may rest assured that the Providence which is over all created objects, extends even to the winged atoms of the insect world, and though millions of individuals are destroyed, the types are not suffered to perish until they have fulfilled the mission, whatever it may be, to which they were divinely appointed.

EXPERIMENT WORK IN DISEASES OF PLANTS.

C. A. KEFFER, COLUMBIA.

The Experiment stations of the United States have been established since 1887, and the majority of them have been in good working order four or five years.

As is usual with our people, the public began demanding results within a year of the passage of the law establishing the stations, and to supply this premature demand many bulletins of only slight value were issued. But with all the drawbacks that have attended their work, the Experiment stations have furnished a supply of information so varied in character as to touch almost every phase of industry connected with the soil, and so accurate as to make of each careful reader a more thoughtful, observant and successful farmer.

The specialists in botany and horticulture found many lines of work demanding attention when the stations were organized, and their labors have been attended with a large measure of success. Probably nothing with which the horticulturist has had to contend has caused greater loss, or seemed so much beyond his control, as the many diseases of fruit and vegetables known under the popular names of rust, rot, scab and blight. At the outset, the stations in several of the states were fortunate in numbering among their workers eminent botanists who had already progressed far in the study of these diseases from a scientific point of view. Such men as Atkinson, Arthur, Halsted, Pammel and Scribner, scientists in the best sense of the word, had been investigating independently and in co-operation with other distinguished botanists, making a complete classification of fungus plants, noting their methods of growth and reproduction, and the plants infested by them, and endeavoring to find preventives or remedies for them.

The organization of the stations made it possible not only to broaden the scope of the investigations, but to place within reach of the fruit-growers, in language easily understood, the knowledge already acquired, and to give to researches that had thus far been conducted largely for scientific purposes only, a strong practical bias, making them of direct and immediate use to the horticulturist

It has seemed to me that I could render the fruit interests of the State no greater service at this meeting than to review the work done by those stations that have led in the study of plant diseases. The reports of the Bureau of Vegetable Pathology at Washington—more comprehensive than any issued by the stations—will not be considered, because they are more easily available. Should it seem desirable, there will be printed, as an appendix to this paper, in the annual report, a complete bibliography of all bulletins touching on the subject of plant disease, thus enabling any member to secure a record of any line of experiments thus far made.

For convenience, the diseases of plants may be roughly classified as:

1. Those which injure the fruit, as grape-rot and apple-scab.
2. Those which injure stem and foliage, as anthracnose, rust and blight.

Investigators have endeavored to determine (1) the full life history of the fungus, (2) what injury it causes, (3) remedies or preventives.

Beginning with class 1, let us first consider what the stations have done in the treatment of the disease of the grape known as black-rot.

The most valuable, because the most exhaustive, bulletins on the rots of the grape have been issued by the stations of Tennessee (No. 4, Vol. 4, 1891), Delaware (No. 6, '89, and 10, '90), and Massachusetts (No. 17, '92).

Prof. F. Lamson Scribner, of the Tennessee station, one of the highest authorities on diseases of the grape, gives the best description in a well-illustrated bulletin of black-rot of the grape (*Læstadia Bidwellii*, Ellis) He tells us the disease is a plant consisting of many fine tubes which grow in the tissues of the affected parts, absorbing their nourishment. They produce three kinds of reproductive spores; two are formed during the growing season, and serve for the immediate spread of the disease from one part of the plant to another, and from plant to plant; the third appears in the early spring, in berries that rotted the year previous, and thus carries the disease from year to year. It is because the spores are produced in such vast quantities during the entire early part of the season, and grow so quickly after they mature, that more than one spraying is necessary. If only the early spring crop of spores were produced by the fungus, a single spraying, about the time the leaves push forth, would prevent serious disaster; but these early spring spores germinate and produce a plant that pierces the skin of leaf or stem, or young fruit, on whichever part it has happened to fall, and in a very short time the young plant begins to form the two kinds of summer spores, each of which germinates within a few days of ripening; and thus spores are being produced and infesting the new growth as rapidly as it is extended. As the disease is safe against all remedies when it has penetrated the grape plant, we must apply the fungicide in the hope of killing the spores as they fall on the vine. As there are three kinds of spores in the beginning of the season, great vigilance is necessary in spraying at that time.

Heat and moisture are favorable to the development of the disease, and the opposite conditions unfavorable. So too hot dry weather is not at all favorable for it, as compared with moist hot weather; hence, a drouth year is attended with little rot. All experimenters are agreed on the following points in fighting diseases of the grape:

1. A washing of the vines and trellises with strong solution of blue vitriol before growth starts in the spring, to destroy spores attached to old wood. This can be accomplished either by heavy spraying or by washing with brush.

2. Either Bordeaux mixture or ammoniacal solution of carbonate of copper should be used for spraying after growth starts. The strength of the former mixture is reported variously, the general tendency being toward the use of a much weaker solution than was thought necessary when the experiments began—the Connecticut Station even recommending one pound Cu. S O 4, one pound lime, to 22 gallons water. The formula usually followed is three pounds Cu. S O 4, three pounds lime, to 22 gallons water. As Bordeaux mixture discolors the fruit, most experimenters advise that the last spray be of ammoniacal solution of carbonate of copper.

3. The importance of early applications is insisted upon. Under most favorable weather conditions, four sprayings are recommended, with additional ones if the season is wet. The times of spraying are about as follows: 1, when the new growth is not more than four to eight inches long; 2, just before blooming; 3, just after blooming; 4, when the fruit is the size of small shot. This will bring the applications about two weeks apart. All agree that less time should elapse between the earlier applications than the later.

If Bordeaux mixture is used for all sprayings, it can be washed off in a solution of 2 quarts cider vinegar to 10 gallons of water—the fruit being dipped in clear water after being submerged a few minutes in the solution.

None of the experimenters claim that any of the fungicides now in use will entirely prevent grape-rot, nor that the disease will not be most harmful in a wet season; but the unanimous testimony of all the stations that have experimented in this direction is that spraying, if done early and often enough, is not only a great preventive of rot, but is an entirely practical and profitable operation.

Scribner, of Tennessee, and Greene, of Minnesota, advise the bagging of grapes where only a few vines are grown, as a half acre or less. Bags put on as soon as the flowers are fertilized will insure a full crop, free from blemish by disease, bird, insect or dirt.

Wherever reported, the second and third years' treatment was found more effective than the first. Thus, the Tennessee Station reports:

First year—Treated vines lost about one-third of what would have been a full crop. Untreated vines lost practically all of what would have been a full crop.

Second year—Treated vines lost none; 10 to 25 per cent, according to variety.

The Delaware Station reports as follows: "In 1888 Mr. Lee Anthony's vineyard yielded no revenue, owing to attacks of black rot. In 1889 this disease was controled by Bordeaux mixture, and something more than one-fourth of a crop of merchantable grapes was thereby saved. In 1890 the same vineyard was again protected against the black-rot spores; aided by a favorable season, this fungicide allowed said vineyard to give a large and exceedingly profitable yield of grapes." —Bul. No. 10.

Of downy mildew, or brown rot, which is quite as destructive as black rot in some localities, and submits to the same treatment, the Ohio Station reports, among other successes: "Sprayed vines on Kelly's Island averaged between two and a half and three tons per acre; unsprayed vines not to exceed a ton, and on many as low as half a ton. Loss of fruit from what set on sprayed vines would not exceed five per cent. Foliage on sprayed vines is much better, holding onto the vine longer, and thus ripening the wood so as to withstand a greater amount of cold.

At the Missouri Station, Professor Clark reported, as the result of spraying in 1889, after the crop of '88 had been completely destroyed by fungus, that "on vines sprayed but once (all were sprayed), fully four-fifths of the fruit rotted, except Goethe, of which not more than half was poor, while on vines that were sprayed regularly, 75 per cent of the fruit was sound."

Other diseases of the grape besidos those referred to are being studied, and it is found that the three most common fungicides, Bordeaux mixture, ammoniacal solution of carbonate of copper, and Eau Celeste, are more or less effective against them all.

ROTS AND SCABS OF ORCHARD FRUITS.

These diseases are caused by several different species of parasitic plants, more or less similar in habit and methods of reproduction, and submitting to the same remedies, of which the active agent in all is copper.

The work of the Experiment stations with these diseases has been very extensive, particularly in those states in which the orchard industries are large and well established. Among the most valuable bulletins on the rots and scabs may be mentioned New Jersey, No. 91, issued in 1892, on quince diseases; Ohio, No. 9, Vol. 4, 1891, and No. 28, 1893, on apple scab; Delaware, Nos. 15 and 19, 1892, on peach rot; Vermont, No. 28, 1892, apple and pear scab; Virginia, No. 17, 1892, on scab and rot; Cornell, N. Y., No. 48, 1892, on apple scab; Massachusetts, Nos. 11 and 17, on fungicides and insecticides, combined; Kentucky, No. 44, on rot and scab of apple. A most valuable document, in which a great variety of plant diseases is discussed, is the report of the Botanical Department of the New Jersey Station for 1892.

In Bulletin No. 9, vol. 4, of the Ohio station, apple scab is well described, and illustrated experiments were undertaken to determine (1) what compounds to use, (2) when to apply them, (3) with what fungicides can Paris green and London purple be used, and (4) the profit of spraying on an extensive scale. The experiments were made in an orchard of 30 acres, and there were enough apples of one variety—Newtown Pippin—to spray two rows with each of the following solutions: Ammoniacal solution of carbonate of copper, modified Eau Celeste, dilute Bordeaux mixture, precipitated carbonate of copper, and ammonia-copper. Five rows were left unsprayed as a check. The trees were sprayed seven times—April 8, May 7 and 26, June 13 and 19, July 16. Frequent rains made this number of sprayings necessary. In estimating results, 10 bushels of fruit were taken from each plant so as to include about an equal quantity from each tree. Each lot was assorted into three grades: 1st, free from scabs; 2d, more or less scabby, but marketable; 3d, very scabby and unmarketable.

The dilute Bordeaux mixture gave best results, with 15% 1st grade, 74% 2ds, 11% 3ds. The unsprayed trees gave no 1sts, 40% 2ds and 60% 3ds.

It was found that the cost of spraying 100 trees for the season, material and labor included, was $14.10, with Bordeaux mixture alone, and $15.10 with Bordeaux and Paris green. The remaining fungicides were more expensive, except ammonia copper solution, but this was not anything like as valuable a preventive of the diseases.

It was found that in addition to making the fruit unsightly, scab retards the growth of both leaves and fruit, thus making the scabby apples smaller than the clear ones. A bushel of Newtown Pippins, free from scab, contained 202 apples, while a bushel of scabby specimens of the same variety numbered 317, the average weight being four ounces and two and one-half ounces, respectively. In Ben Davis, scab did more harm to foliage than to fruit.

Benoni, Northern Spy, Rome Beauty and Newtown Pippin were sprayed with Bordeaux mixture, and as compared with trees not sprayed, the increase in value of fruit per 100 bushels was from $24.05 (Northern Spy) to $33.74 (Rome Beauty). The cost of spraying did not exceed two cents per bushel, and the average increase in value was 28 cents per bushel.

In Bulletin No. 48, Cornell University (New York) Station experiments made in 1892, although the first of four applications of Bordeaux mixture and Paris green was not made until June 13, much too late for the best results, the sprayed trees showed a gain of 34.7% in good fruit over the unsprayed. This bulletin includes a list of varieties of the apple with reference to their tendency to scab, as grown in New York State. Among varieties most grown in Missouri, Ben Davis is reported from 13 localities as not seriously affected, and from eight as free; Grimes' Golden, six report not serious, seven free; Willow Twig, eight not serious, one free; Jonathan, 10 not serious, four free; Missouri Pippin, five habitually bad, two not serious, two free.

Among varieties most subject to rot—all worse than Missouri Pippin—are Early Harvest, Fameuse, Winesap and Red June.

The Delaware Station has made a special study of peach-rot, and Bulletin No. 19, issued December, 1892, is devoted to a preliminary report of experiments. An experiment in 1891 resulted in great benefit from ammoniacal solution of carbonate of copper, but the fungicide injured the foliage badly. During the season of 1892, four fungicides were tried: (1) Ammoniacal solution of carbonate of copper, using aqua ammonia. (2) The same, using carbonate of ammonia. (3) Copper carbonate in suspension. (4) Neutral Bordeaux mixture.

The first applications were delayed too long, as the fungus was found to have injured the blooms before any spray was applied, but the average result was that the amount of rot was diminished one-half, as compared with unsprayed trees. All sprays injured the foliage very considerably, and to about the same extent. The rot did not seem bad until the time of ripening approached, just before the sixth (last) application was made. It was found that the spores of the fungus could germinate on the surface of the peach, and cause a rotted speck to appear in 18 hours' time, and in 2 to 4 days the peach would be unfit for picking; from which it was inferred that it is important to make the interval between sprayings at about the time of ripening very short. An outline of treatment for rot is given, which includes: (1) Gather and burn all mummified fruit before spring, and preferably just after crop is removed. (2) Spray before buds swell in spring with one pound copper sulphate to 25 gallons water. (3) When fruit-buds begin to swell, spray with either ammoniacal solution of carbonate of copper or neutral Bordeaux mixture. (4) Spray again before buds open. (5) Again when fruit approaches full size and begins to show color. (6, 7, 8) Make two or three applications at intervals of five to seven days during the ripening period.

I have reviewed at length the treatment of orchard rots, because of the wide interest in the subject in this State. The other bulletins mentioned contain much that is valuable, confirming results noted above.

In addition to the rots and scabs of the fruit of orchard trees, much attention has been given the diseases of their foliage.

Of the excellent bulletins on this branch of the subject, the following are among the most useful: No. 17, Massachusetts, on leaf-blight and rot; No. 13, Delaware, on leaf-blight of pear and quince; Nos. 13 and 17, Iowa, leaf diseases of many fruits, including cherry and pear, especially valuable; No. 18, Cornell, N. Y., on danger to foliage of arsenical spray; No. 40, Geneva, N. Y., on black knot of cherry and plum. In this same connection, because the treatment is the same, may be mentioned the study of leaf and stem diseases of the small fruits, including strawberry leaf-blight, leaf-spot of currant, anthracnose of raspberry and blackberry. Kentucky Station in Bulletin No. 20 discusses strawberry leaf blight and recommends Bordeaux mixture. Ohio Bulletin No. 6, Vol. 4, '91, describes anthracnose of blackberry and raspberry and recommends Bordeaux mixture, the first application only to be applied to fruiting canes, and three subsequent sprayings on the new growth. Iowa Bulletins Nos. 13 and 17 record extensive experiments in the treatment of leaf-spot of currant and gooseberry, in which ammoniacal solution of carbonate of copper is considered more effective than Bordeaux mixture. Concerning leaf diseases of orchard trees, the Iowa bulletins referred to give a well-illustrated description of the spot disease of the cherry and a discussion of pear-leaf blight, with experiments which show that both yield to the ammoniacal solution of carbonate of copper. Both cherry and pear suffer from diseased foliage in nursery as well as in orchard. Delaware Bulletin No. 13 describes and illustrates the leaf-blight of the pear. It was found that four applications of Bordeaux mixture, at a cost of 2.2 cents per tree, "enabled the trees to retain their leaves well, while the few unsprayed trees were more or less completely bare."

Summarizing the work of treating orchard fruits for fungi, we find:

1. The different rots, scab, spot diseases and leaf-blight may be controlled by copper solutions.

2. The majority of the experiments seem to indicate that Bordeaux mixture is the best fungicide to use, and the formula most often recommended is six pounds blue vitriol, six pounds quick-lime, 45 gallons water.

3. Ammoniacal solution of carbonate of copper is considered best by some, and averages a high second best. The formula is five ounces of copper dissolved in three pints strong ammonia, diluted with 45 gallons water.

Neutral Bordeaux mixture is the best fungicide for peach-rot. The formula is four pounds blue vitriol dissolved in hot water, cooled by adding six to eight gallons cold water. Milk of lime added until red litmus paper just begins to turn blue. Dilute with water to 25 gallons.

5. Early applications are essential.

6. In all cases, whether for rot or leaf disease, spraying results in increased healthfulness of foliage and greater vigor of tree.

7. The cost is, in all cases, more than met by increased marketable product.

8. Peach foliage is more or less injured by all fungicides.

There now remains but one phase of the general subject—the treatment of diseases of garden vegetables. The work done on vegetables has been set forth in bulletins by the following-named stations, among others: Celery diseases, bean diseases, potato scab and blight, Geneva, N. Y.; tomato blight, Mississippi; sugar beet diseases, Iowa; potato scab and blight, Rhode Island; œdemia of tomato, onion mould, Cornell, N. Y.; diseases of celery, tomato, sweet potato, egg-plant, bean and many ornamental plants, New Jersey. On all these subjects details of growth and reproduction, with experiments in fungicides, are given. Much effective work has been done in investigating the fungus enemies of cereal crops, but as these are not horticultural products, no mention of them will be made.

When it is recalled that the treatment of vegetable diseases is only one of several important lines of work that are being carried on by the botanists and horticulturists of the stations, it will be seen that large efforts are being made to aid the fruit-grower to a more profitable return for his labor. C. A. KEFFER.

CULTURE IN THE HOME.

MRS. JULIA M'NAIR WRIGHT.

LADIES AND GENTLEMEN—My theme is "Culture in the Home." In discussing any question before an audience such as this, certain fundamental propositions may be taken as granted. Your membership in this Society, your presence here, testify your acceptance of and interest in some given facts. It is not necessary to prove to you that the home is the mould wherein are, to a large extent, cast the manners and character of the individual—that it is the norm of the State. It is not necessary to tell you that by "a home" more is meant than four walls, a floor, a roof, and varied arrangements of the enclosed space; that of the home there is a subjective as well as an objective point of view; that it is not merely the center of physical and financial development, but also of moral and mental development. The home is not merely a shelter from burning suns, a refuge from beating storms, but it is the heart's refuge in disaster, its shelter from the wild sweep of temptation. When Napoleon embraced large philosophies in one sentence, saying that the chief need of France was mothers, he comprehended in that word "mothers" as administering homes, and there rearing worthy citizens.

When we build a house in which to live, the primary considerations are, or should be, healthfulness, convenient arrangement, beauty. When we lay down the laws for the life conducted in that house, we will, I think, find them falling into the same or similar lines, as the development of a strong physique, the useful direction of energies, and the training of the mind, or that all round education which includes right knowing, right thinking and right behaving—generalized, perhaps, effectively enough for our present use in the word "culture."

Now to secure culture, it is not indispensable that one should live in Cambridge or Boston, in Baltimore or Richmond, or in any city whatever.

Culture does not depend upon lines of latitude and longitude, a certain fortune or a city home; it depends upon the fashion of the home itself—just as our happiness does not depend upon our skies nor our environment, but upon the temper of our souls.

In speaking of culture in the home, I shall confine myself to what may be possible in and applied to a country home; for the country home is the norm or center of development of all our homes. Farm life is the beginning of all civilized life; out of it bud and unfold all our industries and all our achievements. Close beside the farm homes lie the village homes; if we can raise the rural homes to their highest possible ideal, then the prosperity of our land is assured; we shall have all that the old Saxons included under the words "stal-worthy citizens." Moreover, if we can bring the rural homes to their highest ideal, we shall stop that ominous push of the population upon the cities, whereby the cities become as the dragons of old—devourers of young men and maidens, and leviers of disastrous tribute on all the land—the threat, and incubus, and mob-masters of the State.

When the inhabitant of a rural district finds himself at a disadvantage in his habitat, he flies to the city, expecting to find there all that has been lacking to his comfort. Generally he changes the place but keeps the pain, for his disadvantages are not the result of his *locale*, but of insufficient culture therein given to him; and lacking that culture, his discomforts are equally great anywhere.

We want homes that shall make their occupants rich in themselves; which shall bestow upon our children mental, moral and emotional riches; which shall make them happy in themselves and sources of happiness to others. To secure such happiness and such culture we must have suitable appliances, and these are neither difficult to obtain nor to put into active service. Our homes must be such that our young people shall be happy in them, and feel that they are on the upgrade, making the most of themselves; then they in turn will joyfully make the most of the home. I submit to you the proposition, that unless our homes themselves are constantly improving, and also improving their inmates, unless they are offering scope to our higher faculties, then our sons and our daughters cannot hopefully remain in them, expecting a benignant future.

What are some of the methods by which we can elevate and improve our homes, and, therefore, ourselves?

We must individualize;
Give time for culture;
Possess appliances for culture.

By individualizing I mean that the natural tastes, the mental proclivities of each member of the household, should be recognized; that his cultivation should be in the line of his abilities. In the cultivation of plants we regard the kind of soil which, as we say, is preferred by each, as clay, sand, loam. Why not give the human individual as fair a chance as the plant individual?

The solution of each term of our biological problem is largely the same. Where the lad's taste is for geology, for archæology, why not give him some scope in that line, instead of virtually saying "literature or nothing." The girl's passion may be for flowers, or for decorative art; why, then, give her a piano and an exercise book, and say, music or nothing; or if the yearning is for music, why rebuff a God-given taste, and say, "music is for richer folks, go weed the onions." One longs after books, another after tasteful arrangements, dainty prettiness of home and surroundings; in the name of common sense, then, why not are these inclinings as so much family capital? Let us cultivate individual preferences, and so round up the whole home life into a beautiful completeness.

But so to cultivate, it is evident that one should have time left for cultivation—leisure. Here is a point of importance: all our homes should not be spent in a perpetual grind for bread, acres and coupons. Let the higher nature have its opportunities; let the sensibilities be cultivated as well as corn and potatoes. As by fostering individual tastes we succeed at last in obtaining for the home, culture along all important lines, and so make home life beautiful and beloved, by granting a just leisure to each member of the family we make the home, not a prison, but a paradise. There are golden hours for rest and enjoyment and self-improvement, and these lend their blessed glow to the remainder and raise them above the level of common things.

Let me illustrate: A farmer of my acquaintance who got from his boys more and more willing work than any other that ever I knew, let me one day unwittingly into his secret. I think he did not know that he had a secret. He said: "We don't rise at dawn at my house; I don't want the family to feel that they begin the day by being robbed of rest; I don't drive, drive, drive until dark; when a hard push is needed, the boys see the need and give it; but I like to let them have time for their own pleasures. When one of them by diligence finishes a piece of work ahead of time, I don't set him at something else immediately and so put a penalty on diligence. I say, 'there lad, go a fishing, or go and read, go visit your friends, go swing in the hammock, go play on your violin, or whatever I know that particular boy best likes to do.' That, you see, is a reward of diligence." That was his secret—one I submit to you worth knowing. I beg of you lay to heart that illustration, and let it impress upon us all the advantage of securing to each one leisure from the moiling and delving of our common life. We have in nature God's example for this—

O friend, I pray you bear with me;
The grass hath time to grow in meadow lands,
And leisurely the opal, murmuring sea
Breaks on its yellow sands.

And leisurely the ring-dove on her nest
Broods till her tender chick shall pick the shell,
And leisurely down-fall from ferny crest
The dew-drops in the well.

And leisurely your life and spirit grew
With yet the time to grow and ripen free.

This leisure will make working hours more effective; it will make our minds brighter, our hearts warmer, our tempers sweeter.

Given this leisure, what are some of the appliances for home culture wherewith to fill our leisure, so that it shall be a busy leisure, full of the rest of change of thought and broader growth?

I cannot expect to do more than hint at a theme which has filled and may yet fill volumes. As I said at beginning, much must be admitted as granted.

Order, scrupulous neatness, the *method* that makes leisure possible, the common sense which administers all—these are to be assumed as present and lying at the very foundation of culture in the home.

I will mention but four of those accessories of home life which especially tend toward what we call culture.

These are books, pictures, flowers, music. If we wish our children to love home and be loath to leave it; if we wish our homes to build up to better and better, and to be refined and refining, helpful, attractive and restful, we cannot afford to be without at least the first three of these. I am not sure that we can afford to have less than all the entire four.

As to the books: We live in an age when books are placed beside bread among the necessaries of life. We should as soon think of doing without books as without the modern appliances of labor. Time was when our ancestors had no books; indeed, as a general thing, they could neither read nor write. Centuries later they had a Bible, an almanac, and a book on farriery or the veterinary art. We have passed the age when so few books suffice, just as we have passed the age when people used a sharpened log for a plow-share, or dibbled the ground with a pointed stick when they wished to plant a garden.

Besides the Bible, which has made progress possible, we now place on our home book-shelves a long and glorious list of books of poetry, history, essays, philosophy, travels, science, biography, romance, to fill, enrich and beautify our lives. The home without books falls behind its age. It is not only laggard in refinement, but its finances are administered in a meager and the crudest manner; its money is earned in the hardest methods and brings the poorest returns. I could illustrate, but I forbear. Look about you.

Next to books I would place pictures as means of culture in the home. I do not here intend a rough print of a prize ox, or of a mammoth cabbage, not a coarse chromo of the impossible, but some picture or pictures which minister to thought and elevate sentiment, cultivate taste and present a moral lesson. The pictures may be steel engravings, or merely wood-cuts, but let them be good of their kind. Let us remember that these pictures are the child's first teachers, next to his mother's smile. Before he can read he can catch the object-lesson in the picture. The walls of his home will then be associated in his memory with beauty, refinement, some good uplifting thought, which shall rebuke the violent, the coarse and the evil.

Now-a-days pictures are almost as easily obtainable as books. What hundreds of really good pictures are thrown away, torn up, generally neglected and destroyed, because they have come to us in papers or magazines.

I think it would be hard for any one to buy of me a collection of wood-cuts which I have saved and mounted on white card-board within the last 20 years; not a dozen of them have been purchased as pictures, but now, numbering several hundred, they are a collection valuable as illustrating contemporaneous art. Make portfolios of pictures and stand them in the corners of the family room; they will furnish subjects for conversation; the young folks will enjoy showing them to their guests; one of the sons or daughters can make an easel for them; make scrap-books of pictures to lay on the tables. I think some one tells us of a wonderful screen of pictures made by Jane Carlyle.

When I say "let us have flowers in the house as a means of culture for the family," I touch a theme peculiarly congenial to this gathering. When I walk through a village or drive through the country roads, and see verandas covered with vines, beds and boxes of flowers here and there, hedges neatly trimmed, ornamental trees on the lawn; when I see preparation for house plants in the winter, if it is no more than a few tin cans with slips of geraniums, loutennes and parlor ivy, then I see a home on the up-grade, a home where refinement will dominate, and where there shall be a refreshing fountain of beauty for life's toilsome way.

How well God did for man when He set the first pair in that garden full of glowing, luxuriant bloom, thornless, weedless, exuberant, watered by four rivers! I have often wondered why they did not stay there in peace. Apples! What were all the golden apples of Hesperides, compared to such riot of roses as I have seen in December hanging over an Italian wall! What are apples, compared to avenues of tall white lilies pouring out perfume; to glad successions of hyacinths, and splendid tulips, and gorgeous chrysanthemums! O, Paradise, what weary lot was ours when our first parents left those lawns embroidered with crocus and anemone, those dreamful beds of poppies, those borders of violets, the crowning richness of lilacs and rhododendons and laburnums, of myrtles and jessamine, for the dusty ways of trade or the hard furrow!

At least let us have about and in our homes such stray beds of Eden as are left to us. Then shall the eyes of our children be full of fair hopes and pleasant thoughts, and beautiful as pansies dipped in dew; so shall their fingers be trained to gentle touches, and they shall gather some of the mystery of being as they nurture young plants; growing seeds shall teach them lessons of life, and bulbs shall point to them of the resurrection.

Sweet singers should plead to you for music in the home, and should tell you how in accordant voices raised in solemn hymn or lighter roundelay, grievances and animosities die, and he who has learned something of the harmony of heaven shares something of the heart of heaven.

I think a home where the pleasing tones of lovingly touched instruments are heard and voices are raised in cheerful concert is a home which attracts to it the best in its neighborhood, and will be never lonely, never abandoned because it is all so dull and dreary.

Grasp now *in petto* the picture of a home of true culture. The preferences of the individual are cultivated; there is leisure for rest, for improvement, for the inmates to get acquainted with each other; there are books to refine the mind and to keep one abreast with the times; there are pictures to inform the taste and elevate the thoughts; there are flowers full of balm and tender interests—and here I would not even hint how quietly every shrub and vine and tree increases the market value of our homes. Finally, there is music to sound a lullaby to cares and evil passions and charm unrest to peace.

Surely this is the Home of God and this is the Gate of Heaven!

NATURE AND HER LESSONS.

MRS. IRENE DICUS BERRY.

The history of horticulture is coeval with that of man. 'Tis this branch of industry that preserves the traditions of his earliest experiences, and is borne along in closest connection with him, from the time his history emerges from the dim past, to the present day of advanced civilization.

When the heavens and earth were finished, and the Lord formed man of the dust of the ground, before it was considered fit for habitation, a garden was planted eastward in Eden, and out of the ground was made to grow ever treey that is pleasant to the sight and good for food.

A river flowed through Eden to water the garden, and God placed Adam within the grounds that he might dress and keep them.

Notwithstanding the fact that to man has been attributed the honor of every step in advancement, progress and civilization, poor Adam had only wit enough to do as he was told, and the keen womanly wisdom of Mother Eve was called in advice as to how the fruits of his labor should be applied.

In obedience to the natural promptings of her tender heart, his physical needs found ready sympathy, and her willing hands were engaged in preparing for him food and raiment—the noble, ruddy apple, which everywhere intimates culture and refinement, being first used by man for food, and the time-honored fig leaves, deftly arranged by skillful hands, relieved the tried modesty of the "First Pair."

Though Adam has never been praised for his intelligence, we may certainly admire his talent and industry, for God, in his wisdom, would never have assigned him so important a work had he not been specially fitted.

In his own garden were grown the fruits used as his first food, and from that time fruits have been universally diffused, grown and cultivated with the most tender care into many and rare varieties.

The horticulturist, the florist and the landscape gardener have assigned to them by the Great Architect and Designer of Nature's works, most prominent parts.

Like Orpheus, the mythical civilizer of Greece, who tamed the wild beast and stayed the course of the rivers, they have within their hands the magical instrument by which the human passions may be tamed to consonance and harmony.

The sweetest chords and most touching melodies are to be executed in Nature's conservatory for the accomplishment of a divine purpose—the design of God's forethought.

To the unthinking mind the majesty, variety and beauty of God's work in creation, bringing into existence immortal man enthroned in a paradise of love and grandeur—all requiring less than the physical effort of a thought—would seem like a fairy tale.

The creation was not a mere display of wisdom and power, but every particle of matter brought into existence to serve an important part in the great terrestrial economy; the end of which serving as ready illustrations in the study of moral and spiritual lessons.

The entire code of nature's laws may be embraced in the little secret of motion and rest.

If we may believe the nebular hypothesis, in her laboratory from which has sprung the earth and all that in it is, there was but one material from which has been compounded the myriad varieties—countless as the sands. Whatever forms may be assumed, fire, water, tree, or man, the same properties are betrayed, and but one matter used.

If we study her work, we seem to catch a glance of a great system in ceaseless change, and yet, according to her consistency, ever the same.

His plans are folded in many mysteries. All is made of one common material, and no form unfits for future use.

Things bear such close relation to each other that there is really no deviation from natural life. We are but parts of the grand common system. The elements these precious bodies use may have served a purpose millions of time before; in what form we know not—whether poet, beggar, tree or flower.

Hamlet, in addressing Claudius, though mad, was not unwise when he said; "Man may fish with a worm that hath eat of a king, and eat of a fish that hath fed of a worm." For, as has been so beautifully expressed by Alexander Pope, we

"See dying vegetables life sustain,
And life, dissolving, vegetate again;
All forms that perish other forms supply
(By turns we catch the vital breath and die);
Nothing is foreign; parts relate to whole;
One all-extending, all-preserving soul
Connects each being; greatest with the least,
Made beast in aid of man, and man of beast;
All served, all serving; nothing stands alone;
The chain holds on, and where it ends unknown,"

Emerson says: "Plants are the young of the world; vessels of health and vigor, but they grope ever up toward consciousness; the trees are imperfect men, and seem to bemoan their imprisonment.

"The animal is only the novice and probation of a more advanced order. Men, though young, having tasted the first drop from the cup of thought, are already dissipated. The maples and ferns are still uncorrupt, yet no doubt, when they come to consciousness, they, too, will curse and swear. This is God's own system of evolution in which we find no 'missing link;' but all above and below combined by nature's unbroken chain of love."

By the plastic hand of the Divine Architect each atom attracts, and is so attracted to, that pebble and planet are alike held in place. By the same power is matter endued with various forms of life, all of which bear to one great center—Eternal Good. And yet man, for whose good all has been made and given, is the only creature that has said, "There is no God." Pity the ignorance of ingratitude so inexcusable. It is true, Divine Providence is carried on by the aid of many instrumentalities. But this does not affect the premises. These second causes, whether they be rational or irrational creatures, with or without life, are completely dependent upon God, and could neither exist nor act without His powerful support.

When one effect in nature is produced, care is taken that it may answer the purpose of a second cause, or be instrumental in producing a second effect, and thus again and again, throughout a series of changes, which will terminate only with the end of time, and none can arrest but He who set it in motion.

If there had been left no records of a Supreme Being, no tests of divine truth, it would seem that the innumerable stars of Heaven, the myriad flowers that gem the green carpet of earth, are sufficient proof of His omnipotent hand, and these the overflowing of His wondrous love.

The countless trees and shrubs and spires of grass are so many trophies of His skill and power.

In the dim paths of the wilderness, where no human eye hath penetrated, there the wild rose flings its fragrance on the morning and evening air.

This wealth of beauty and amazing exhibition of creative power are proofs of more than scientific happenings.

No matter upon what leaf in the Book of Nature the eye is turned, there will be found a lesson to learn; and if true to original talent, a store of knowledge is revealed in every object; we "find tongues in trees, books in running brooks, sermons in stones and good in everything."

The horticulturist, the wise gardener, or a student of nature of whatever type, may find in the trees, fruits and flowers sweetest and most valuable lessons.

To a less cultured mind, the fluttering leaves, with the exquisite tints and colorings of autumn days, the ripened fruits and withered flowers, tell only of death; every tinge of coloring bespeaks the presence of an icy hand.

It would seem that Nature is busy all the year preparing herself for the last touch of "Nature's Artist," and now, clad in her richest robes of gold and crimson, she comes laden with choicest fruits to greet the Frost king, who in waiting receives her.

Tired nature needs rest; and now with her work well done, like one who would "weep without woe and blush without crime," she falls at the feet of her Monarch and asks for sleep.

He grants her request, and that her rest may be perfect and her awakening sure, drapes round her his mantle of crystal as a shield from the monotonous discord of winter's forces.

After a long absence of beauty and cheerfulness from the lonely earth, the spring-time fairies tell us that she is not dead, only sleeping, and will soon awaken to a new and wonderful life—for,

> "With love's divine foreknowing,
> Where man sees but withered leaves,
> God sees sweet flowers growing."

How like unto the human life. The allotted time of man upon earth is but a summer season, which must, of necessity, be one continuous busy round.

Ere we are aware, our time of probation is ended, and with faces turned to the western horizon, we see the autumn sun sinking beyond the clouds of purple and gold.

While in the midst of health and happiness, like unsuspecting nature, man lives as if there were no end to serve, save to make merry on earth. But within there lies a silent force that teaches all must die. As he passes over the meridian, and down upon the other side, in one brief review of his frail life and its accomplishments, he longs for the future. As with the poet, he has never gotten near enough his object.

The end for which we strive in life is deceiving as the mirage in the desert to the weary traveler. No matter for what our struggle may be, as the end is attained the value diminishes, and the prize glistens from a distant future. The soul is never satisfied with achievements, but continually longing for the absent, the elsewhere. This, in accordance with God's will, leads man from earth to Heaven.

His ideal is in the future, and as he views life from the shadowy side, in his blindness he sees most clearly, 'tis only a step. With the flowers and all created force, he lays himself down at the feet of his King, and asks for the peace that rest will bring. We tread softly and whisper, "he is dead."

'Tis autumn now, the chilling blast has entered our home and withered the most tender and loved of our circle. Do we grieve at God's own prophecy? Do we think Him unjust in executing His own laws in the order of creation? Life and death are dependent and inseparable. The flowers die only to return the brighter from rest in their leafy mold. Our bodies perish and to dust return that the soul may waken in brightest immortality.

FRIDAY, Dec. 8, 9 a. m.

The meeting was called to order by the President and opened with prayer by Dr. E. D. Porter, Dean of the Agricultural College.

First was a report from Herman Jaeger on grapes:

NEOSHO, MO., Nov. 27, 1893.

L. A. GOODMAN, ESQ.:

DEAR SIR—Herewith I send you such a report as I am able to make this season:

I continue to diminish the strength of the Bordeaux mixture, and have good reason to believe two pounds sulphate of copper to 50 gallons of water quite sufficient.

I doubt not a bluestone solution, so weak as to evade the necessity of adding lime, will also prevent the germination of the spores of fungi causing rot, etc. But I am afraid such weak solutions will wash off too easily, and in wet years might necessitate more sprayings than are practicable on extended plantations.

There is room for a great deal of experiment in that line.

The calomel remedy against pear-blight I applied to four old and four young trees, affected more or less. So far the remedy proves as effective as Dr. Hensley claims it is. I am anxious to observe those same trees next year, and shall continue the application of calomel where needed, although I have not the least idea how it benefits the blighted trees. Respectfully yours,

HERMAN JAEGER.

RESULTS OF THE YEAR.

The season of 1893 was one of sore disappointment to fruit-growers. Even apples were a failure in Newton and adjoining counties, while grapes were damaged by late frosts and a cold, wet spring, followed by extreme drouth, from which we suffer even now.

Where not sprayed, the grapes were hardly worth gathering, while well-sprayed vineyards yielded a partial crop of smaller bunches than usual, produced on the second shoots, growing after the frost. The vines of the *Lincecumii*, or Post-oak species, and their crosses (especially those with Herbemont), yielded best, because most of them, and especially Nos. 50 and 56, start growing so late in spring that they escape frosts. It would be unfair to compare frosted vines with those not damaged. A just comparison between the many new candidates for public favor is therefore impossible—the more so as the past season was abnormal in various respects. One thing was again proved: "Without spraying, we need not expect success with grapes;" and I incline to add, "Nor with apples either."

The past two seasons we had few or no apples, and for next year the prospect is anything but good. Most orchards lost their foliage from rust, blight and scab before and in September. Late in the fall a new growth started, and apple, pear and cherry-trees in bloom were the rule, rather than the exception.

Most of my apple-trees (about 20 years old) I sprayed for the first time. Used Bordeaux mixture before blooming, Bordeaux mixture with Paris green right after blooming and 12 days later, and again Bordeaux mixture alone three times afterward. From a few trees I got a full crop of sound apples, while the average of the sprayed orchard was about one-third of a full crop.

It is safe to say that the average of this county was not one per cent of a full crop. The trees had bloomed full, but set poorly and lost about all the fruit by scab, insects etc.

More valuable than this year's gain in apples, I consider the fact that the sprayed trees kept their foliage sound till winter, made no attempt at second growth, and promise a fair crop in 1894.

HERMAN JAEGER.

Neosho Mo., Nov. 22, 1893.

DISCUSSION.

J. C. Evans—There is a great deal of information in that paper. We are very much indebted to Mr. Jaeger for much that we know of the grape.

Mr. Kaiser—I buried some grape-vines and let them stay a little late. On the 21st of June a tornado whipped the foliage off so badly that they never recovered. Some of my neighbors said that the wire trellis was the cause of the damage. Did the wire do any harm? (By the Secretary, No.)

GRAPES AND GRAPE-GROWING.

BY LORENZ GEIGER.

Your Secretary wants me to write on this topic, and complying with his wish, I respectfully submit this paper for perusal to those interested in grape-growing, either for instruction, consideration or discussion.

Grapes and grape-vines have a history as old as the human race itself. Grapes as food, and its products as drink, were ever considered important factors for the healthy development of the human body, as it is by our refined and highly civilized race of today. And in the form as high wine, used by artists and scientists, wonderful and useful things were produced by its agency.

Grapes and grape-vines were found by the Norse, when they landed in early days on the eastern shore of the Western continent, long before Christopher Columbus and his party set their feet on the Bahamas.

Grape-vines were brought along by the early immigrants from their native homes in Europe, and were planted in the virgin soil of their new homes. But they failed to grow and to produce fruit. What else were they to do if they wanted grapes, but to resort to those which grew so profusely and luxuriously in the woods surrounding their new homes, and domesticate them, propagate and improve them. And thanks to the indefatigable exertions of viticulturists of old, and more so to those of our own time, we have now varieties to select from as good as have been cultivated for thousands of years in the grape districts of the old world to suit our fancy.

It has been the belief of old that grapes will grow and succeed best on the sunny hillsides only bordering on flowing streams or large bodies of water; but since it has been practiced on hills and uplands remote from water-courses, equally good results were obtained, if conditions were equally good and favorable. My object in writing this article is to interest you in grapes, but I am not willing to enter upon the topic, "How to grow and care for a vineyard," as that is so well said and plainly illustrated in the "American Grape-Growing and Wine-making," a book so well written by Prof. G. Hussman, now of California, which should be in the hands of every one interested in grapes, and to call more particularly your attention to choice and selection of varieties to plant.

It would be folly for me to recommend varieties which succeed well in the immediate locality of my domicile in Central Missouri on the bluffs of the Missouri river, to a locality so widely differing in soil and climate. What does well here may prove a failure somewhere else. In planting grape-vines, we must be guided by a purpose as well as in planting an orchard. If for table, market or wine, or for early, medium or late, or if one wants white ones, red or black ones, if for market, study the wants of your market: though always bear in mind we plant on realization, hoping for the best reward, and in order to be bountifully rewarded for mental and physical exertion, for money expended, and for waiting patiently from two to four years, we must plant the right kind, otherwise our hopes are blighted, and failure and sad disappointment stare us in our faces.

If such grapes as produced by Mr. T. V. Munson, of Denison, Texas (who has been lately called to the editorial chair of a grape journal started by eminent French viticulturists in this country), of which Mr. Herman Jaeger, of Neosho, Mo., speaks (see p. 125 of 34th Report Missouri State Horticultural Society), can be grown in Missouri as well as in the United States successfully, then surely a new era has dawned for the viticulturist as well as for the grape-eating masses of our country.

THE GRAPE-GROWING AREA.

There are now 50,000 acres of land devoted to the vineyards of the western part of New York. This season's crop will be about 8000 car-loads of fruit, or 25,000 9-pound baskets. It is the largest yield on record. The picking begins this week, and gives employment to 20,000 people. The profits may be judged by the following incident:

One grower, who now has 225 acres of vineyard, rented 12 acres of, and 13 years ago to, a man who planted and cultivated the vines for half the crop, the owner furnishing vines, posts, wire and half the baskets. The renter wanted to buy the vineyard after 10 crops had been harvested, and offered the owner $600 per acre for it. After consulting his dairies for the 13 years, the owner found found that the 12 acres had paid for the vines, posts, wire, baskets, taxes and cost of fertilizers, and had further paid the interest on $1000 per acre—all out of the half of the crop received by the owner. His profits for the 13 years were $60 per acre above all expenses, from the time the vines were planted, and no crop at all was harvested the first three years, till the vines were full-grown.

It may be a matter of suprise to know that the records bear out the assertion that this is the largest grape-growing region in the whole world. This year, in order to extend their market, the grape-growers are to send 50 car-loads of the Concord variety to England. The success of California fruit abroad leads them to expect the opening of a new and practically unlimited market.

And with such a grape, as good as Chasselas or Gutadal, we need not fear competition with any imported grapes, wherever they may come from, and I would not hesitate to recommend them for planting largely and make it a standard as is now the Concord.

"The Norton for red wine, and Professor T. V. Munson's P. W. Cample for white wine—who could dare to beat that?"

On page 126 and following, 34th Report M. S. H. S., and on pages 265 to 270, 35th Report M. S. H. S., we find a list of old and new varieties to select from, recommended by Dr. J. Stayman, of Leavenworth, Kas. I am not acquainted with a good many of these newer kinds, though, coming so highly recommended from such sources as Dr. Stayman, we may not be amiss to find the right kind to suit our purposes. Early table or market grapes should be of large, showy bunches, large, sweet, juicy berries, either red or black in color, and of good flavor, and agreeable, fine taste. Medium and late kinds, as well as for shipping, should be of large, uniform bunches, either white, red or black, large berries, with bloom sweet, juicy, rich, skin tough, with an agreeable, fine taste.

Plant one-year old vines with a profusion of fine, yellow roots; vigorous grower; hardy, healthy and very productive; bunch large, showy, rather loose; berries large; skin thin, tough; pulp tender, sweet, juicy, and free from rot and mildew, or near so. There are many of the new kinds that would answer the desired wants, but who could or would furnish rooted vines of such a description to be in reach of a poor grape-grower?

Glancing over the price list of Bush, Son & Meissner, there are only a few kinds of these newer varietios mentioned, and they are rated at such a high price as to be only in the reach of a millionaire. Now what should the poor vineyardist plant? Concord, Catawba, Delaware, Niagara are in our markets, and are found in the markets of our remotest inland towns as well as in the city markets at prices in the reach of the poor man, and we wonder how it is they are so cheap, having been raised in the states of New York, Ohio and Pennsylvania, and shipped a thousand miles and over; should it be possible that there is any margin left for the producers?

On page 371, volume 46, "Colman's Rural World," you may find that grape-growing pays; yes, Concord, which holds its place yet, like the Ben Davis apple or the Crescent strawberry, in spite of their gross opposition.

Concord grapes we want, was the answer of customers from abroad when I offered them Nortons. And in my long career of grape-growing in Missouri I never had as many calls from outside, from Texas in the south and Chicago in the north, for grapes, as this past season, but they were not to be had in our locality; those who had good crops disposed of them in the home market and others preferred to make them into wine, while the majority of grape-growers did not attend to their vineyards, and, consequently, had nothing for their own family use nor to sell. We sold Concords from three to five cents per pound, and Nortons and Goethe for five cents per pound.

Once my friend C. C. Bell said: "There is no money in grapes;" the season of 1893 demonstrated that there was no money in apples, at least not in Missouri.

Mr. Herman Jaeger says, and everyone who has done his duty to his grapevines corroborates him, that with the use of copper salts we can raise the old varieties of grapes again to be profitable.

There has been a time when a vineyard was a heavy incumbrance and a nuisance to its owner, and it is so yet for those who expect a crop of fruit from their vines by simply looking at them.

We must be diligent; we must use the remedies recommended and obey the teachings of scientific men, who have found by profound studies and repeated experiments the causes of grape disease, and accordingly applied the remedies to prevent the parasitic growth.

It was known to the grain farmers of hundreds of years ago that copper vitriol or blue-stone is a preventive of smut in wheat. They treated their seed grain with a solution of that, and their reward was a crop of wheat free of smut.

And smut is a fungus as well as phoma or perenospera on the grape-vines (black rot and mildews). Prof. Millardet, of Bordeaux, France, is the man to whom the viticulturist is indebted for having first recommended the use of sulphate of copper and lime in a liquid form, now commonly known as Bordeaux mixture.

He is the same scientist who has first tried and recommended the use of bluestone in powder form, in combination with powdered soap-stone, to be applied by means of bellows on the vines, when the leaves were moist with dew, or after a rain, and it is believed that it is more effective and adheres better to the leaves than the solution; it is cheaper, it is easier applied, and in combination with Paris green it is a powerful insecticide, as well as fungicide against apple-leaf rust, apple scab, apple-worm, against peach and plum rot, and the curculio in stone fruit, as well as against injurious insects to grapes, as grape-vine flea-beetle, grape leaf-hopper, or thrip grape leaf-roller, and grasshoppers and grape curculio. This Fostite, as it is called, does prevent, when blown on pear trees, pear leaf-blight.

Now, allow me to speak a few words on pear twig-blight, or fire-blight. When years ago, it was believed that the sap in very thrifty and succulent shoots soured, the idea of such a supposition of causes was laughed at, even by botanists. Prof. Waite of the Agricultural department, Washington, D. C., found that there are 28 different diseases of the pear-tree, mostly caused by fungus growth, which could be prevented by the use of copper salts, but pear blight, he says, is caused by a microbe—bacterium, Prof. J. M. Clark calls it. These bacteria live in the flowing sap and cause the destruction of the twigs, limbs and body of the tree; they give us the cause of the disease, but don't say how to cure or prevent it.

It remained for Dr. Hensly, of Springfield, Mo., to give us an effective remedy to prevent pear blight (see p. 117, 35th Report Missouri State Horticultural Society). Now, doctors apply antiseptics against bacteria in animal bodies, why should not the same be the case in plants or trees? The mercurial salts, as well as salicylic acid, sulphur and others are antiseptics, and when applied to the flowing sap in a tree are sure death to bacteria, and the tree, freed from the causes, develops a healthy growth again. Last spring I have treated my Bartlett trees to a good dose of calomel, and I never saw a tree grow as healthy, without the least sign of a black leaf, as they did. Thanks to Dr. Hensly for his unselfish motive in communicating this remedy to the pear-growers.

And now let us sum up on grapes: 1. Selection of a suitable location. 2. Thorough preparation of the plant-bed (soil). 3. Making and laying off for planting. 4. Selections of plants and varieties. 5. Planting. 6. Tilling, fertilizing and spraying. 7. Pruning (summer and fall or winter). 8. Trellising, and patiently waiting three years before a crop of fruit could be harvested. For the first two years you may raise a crop of strawberries between your young plants, but after that they need all the space for themselves. Bear in mind always, it is essential to have a healthy growth of foliage on your vines, and see to it that they make a vigorous growth; hence you have to be vigilant. Keep the soil loose and free of weeds, never work it when wet, and loosen your ground after every rain or spell of rains; use fungicides and insecticides freely and judiciously, early to late in season, and your labor and outlays will be rewarded in due time bountifully. Read, study and digest, attend horticultural societies and farmers' institutes; love your vines as you would your pet colt or any other of your domestic pets, and you won't fail in your occupation as a grape-grower.

Your old vines will need your close attention, too. Keep them in a vigorous growth by a free application of fertilizers and thorough tillage; prune short, rub off all the loose bark, it is a harbor for fungus, spores and insects; rub all of the growing shoots below your bearing canes to the ground; summer prune timely and judiciously and apply Bordeaux mixture or Fostite early and late. If some of your old vines decay, replace them by a young plant or by laying a neighboring cane in the ground along your row; it will make a strong vine in the first season and bring fruit the next.

Bagging grapes is rather a tedious work. It has to be done long before the fungus is visible by the naked eye or by the microscope, and it will answer only on a small scale, though whoever may practice that must apply the remedies recommended for blast, rot or mildew, for a healthy leaf is the main thing for the development of fruit in ripening and for quality, even if enclosed in bags.

Humble yourselves under the will of Him from whom all blessings flow, and rest contented in the shade of your vines.

On my eight-acre lot, within the limits of the city of Boonville, is about one acre of land, which has been used for the production of garden truck ; all the other is in fruit trees, grapes, berries, rhubarb and asparagus. It is well situated for grapes, and is now prepared for next spring's planting. I intend, if life and health are spared, to plant all of it with grape-vines, and I am thinking to set out 300 of Munson's G. W. Cample, 300 of Mr. Burr's Ideal, 300 Paragon, and the rest, about 100 of Dr. Fayman's Ozark ; provided I am able to get one-year-old good and well-rooted plants at a price to suit a poor man's funds ; and if not, the whole shall go in Elvira vines, on which to graft, after they are well established, such kinds as mentioned afore. Besides, do I intend to plant along the rows, at a suitable distance, pear trees, which will serve in a short time a support for the wires, and I shall select such varieties as Kiefer, Garber, Bartlett and Duchess. What is your opinion ?

DISCUSSION.

Mr. Geiger—Wire trellis does no harm. I intend to plant six or eight acres in grapes, and to plant Keiffer and Garber pear trees for posts.

Espenlaub, Goodman and Miller said the Jewell grape is a poor grower, worse than the Delaware.

Henry Schnell—How do you apply calomel to prevent pear-blight ?

Mr. Geiger—Cut the bark as for inserting a bud, put the calomel in a tube and blow into the cut.

C. H. Loomis—Can you graft the tame grape into the wild ?

S. Miller—It is all right if you can get it to grow.

Mr. Kaiser—What variety makes a good stock into which to graft weak-growing kinds ?

Mr. Geiger—Elvira is a good one.

S. Miller—Ives is said to be the best of all.

President Porter—I have been very successful in grafting wild vines. I dig out the main stem of the wild vine, leaving only the roots. Graft upon the ends of these roots in the fall or very early in the spring. Nine out of ten will grow. The next fall dig up the vines and you will have good vines.

S. Miller—I did that way twenty years ago. In the old stem it is very difficult to get grafts to grow.

Mr. Espenlaub—Why not plant Concord, Elvira or other strong-growing kinds in nursery rows for grafting ? They will make better roots than the wild vines.

S. Miller—We grafted in the wild vines when we had no other young vines into which to graft.

Mr. Jaeger contends that we can grow the foreign kinds by grafting in natives and spraying to prevent mildew and rot. He sent me two bunches of perfect grapes of this kind. If you keep the foliage healthy the vines will be hardy. It is unripe wood that dies. The late-grown green wood in the fall freezes, and in consequence the whole vine becomes diseased.

Jaeger's No. 50 is a magnificent black grape, medium size, very fine, spicy, too tender to ship.

Husmann's is a good work on the grape. He is making a new edition, which will be preferable. I think early grapes will be more profitable with us than late ones. They can be marketed before the New York grapes. We must spray for the benefit of the foliage. Sacking is a great deal of trouble. I have a way of protecting grapes from rot, but not from birds: take a circular piece of paper, cut out a triangle, and pin the paper over the bunch.

Mr. Porter—Paraffine paper will last longer than common paper; it withstands rains.

An invitation from the School for the Deaf and Dumb was received, asking the Society to visit the school at 7:45 a. m.

The Society accepted the invitation, and asked the school to visit the hall and see the fruit on exhibition at 12:30.

The officers of the State Insane Asylum invited the Society to visit that Institution.

The invitation was acknowledged and thanks extended, but it was found impracticable to visit the asylum in a body. The members were requested to go as they could get time.

THE KEIFFER AND GARBER PEAR—THE LE CONTE FOR FRUIT AND AS A STOCK.

R. J. BAGBY.

The Keiffer is so well known it needs no description. Since people have quit trying to eat them before they are ripe, it is conceded by all to be a very good pear. both for general use and for market, and is probably more profitably grown in this State for market than any other variety. Care should be used in marketing them. Let them color before shipment, and they will then reach the consumer in an eatable condition. The pear orchards that we see at the present time in Eastern Missouri are largely of this variety. In the Illinois fruit belt, in Marion and surrounding counties, large bearing orchards are to be seen exclusively of Keiffer. They are on the St. Louis and Chicago markets from September till December in large quantities, and as sufficient proof of profit to growers, we find them being more largely planted each year in East Missouri and in Central Illinois for these markets than all other varieties combined. It has not only taken the front place among pears in this section, but ranks in the front for profit to the general fruit-grower. In the South we have seen them planted along the roadside for miles, and one orchard near Fort Valley, Georgia, has over 10,000 Keiffer trees. The tree is a vigorous grower in all parts of our own State where we have observed it, and in many localities the fruit attains a perfect russet color when matured on the tree, mellowing to a rich golden after being gathered. Wherever the Ben Davis apple can be relied on, we believe that the Keiffer can be profitably planted, and south of the apple belt it finds a natural home.

There are today probably more Keiffer pear-trees growing in Missouri than of all other varieties combined, and there is every reason to believe the extensive planting of this variety will be profitably continued. A few years ago the Keiffer was unknown on the St. Louis market, but for the past four years, excepting this year of total failure, 1893, we find them in their season taking the lead in every respect among home-grown pears, and equal for all practical purposes, so far as the grower and consumer are concerned, to any on the market. Nurserymen have confidence in its future, and one firm in this State growing at the present time something over 100,000 pear-trees, over 50,000 are Keiffer, 25,000 Garber, and the balance mostly Duchess, Seckel, Sheldon, Bartlett, Clapp's, Flemish Beauty, etc.

The Garber, outside of its growth and habit in the nursery and the orchard, we have but little knowledge of in this section. We have never fruited it in quantity, but we have the fullest confidence in its future; it matures some earlier than Keiffer, about the same size, and when mellow about the same color. The tree is a strong, upright grower, and to blight seems to be entirely unknown. Have never seen a sign of blight on Garber in nursery or in orchard. Blocks of Keiffer, Garber, LeConte and Idaho, grown in the nursery under the same conditions and on the same kind of soil—all or nearly all the Idaho blighted, most all the LeConte in the same condttion, some slight loss on the Keiffer from the same cause, but no sign of blight whatever on the Garber. We confidently believe that the man who pins his faith to Keiffer and Garber and plants them will be abundantly rewarded.

THE LECONTE FOR FRUIT AND AS A STOCK.

When the LeConte was first being introduced, we planted a few trees in orchard, but they lived only long enough to bear a few pears, and then the trees died of blight. Disappointment has followed every effort under our observation toward fruiting this variety profitably in Missouri. In the South, and in Georgia particularly, groves, orchards and roadsides are planted with LeConte, and a large grower near Thomasville told me that he could grow them profitably for less than 10 cents a bushel, which he thought was perhaps more than they should be worth. They blight but little south of the apple belt, but here in Missouri they blight so badly that we do not belive they could be profitably grown generally over the State, even if the quality of the fruit would justify.

For stocks, there was at one time a general effort on the part of some nurserymen in Georgia and Alabama to grow pear on LeConte stock, which were grown from cuttings. We think that the effort has been almost, if not entirely, abandoned. The stocks that we have seen and the trees grown on such stocks are so poorly rooted that they do not suit planters, who demand an abundance of side roots. Another serious objection to it of course is its liability to blight. The average nurseryman at this time will use stocks strictly first-class, with well-branched roots, grown from French and Japan seed, or seedlings imported direct from France. We will venture the assertion that until the past year over nine-tenths of the pear stocks used in this country were imported direct from France. The Japan stocks, so-called, are grown from Japan seed, and are now being used largely, and may in time supplant the French article entirely. They are more vigorous, just as hardy, less liable to leaf-blight or rust, grow later, hence the budding season is extended. Trees grown on Japan stock are much better rooted than on LeConte, and equal to those grown on French stock. Possibly the Le Conte may have a future as a stock, but we confess our inability to see on what its chances for the distinction can rest.

THE PEAR.

BY A. A. BLUMER.

If the apple be the king of fruits, the pear is surely the queen. What edible luxury can be compared to a ripened pear? What healthier? And yet it can be grown nearly as cheap as apples, while they sell twice as high, and there is always a market for them, and bear as surely, and can be had from August to May. I never saw a failure till the last two years. Last spring pear-trees, like apples, were a perfect bouquet of bloom, but while thus in their gay attire a Siberian and boreal night destroyed, not only the embryo pear, but, also, that of all other fruit without exception, large as well as small; but these occurrences are phenomenal, and should not discourage any one from planting.

The pear is as hardy as the apple, and less subject to disease or insects. Yes, sometimes the blight affects them, and no preventive has as yet been found, though salt by one party, and 10 grains of calomel inserted under the bark by another party, have been suggested. Blight, like cholera, is periodical and epidemic; like cholera it affects such trees whose unpropitious soil and starving state predisposes to and invites it, while others not enfeebled by over-bearing, planted in clay soil, pruned and fed, laugh at it.

Pear-trees do not like wet feet; the hole should be deep enough and drained to avoid it. A rich alluvial soil, and a sandy one, while producing an astonishingly rapid growth, the trees invariably come to an early end, proving a total loss, and particularly standard trees. The quince roots can better bear the asperities of soil and vicissitudes of the weather; hence the advisability of planting dwarf trees, and if these be set three or four inches deeper, emit new tiers of roots above the bed, and become half standard, bearing full crops of the finest fruit; but here it requires courage; the fruit ought to be thinned fully one-half, or the constitution of the trees will be ruined if permitted to ripen all of its fruit; liberal pruning in due time must not be forgotten. I have now in my cellar a few Beurre d' Anjou and a few Lawrence pears; and here comes the question, which varieties of pears do and pay best, and which are less liable to blight?

Horticultural writers, among them the late P. Barry, affirm that Beurre d'Anjou, Duchess d'Angouleme and Seckel are comparatively exempt from blight; so says C. T. Mallinkrodt, of St. Charles, to be the Krull—a real winter pear—he introduced a few years ago (I kept a few of these in my cellar until the month of May); and the Bloomington nursery of the Longworth, originated at Dubuque, Io., and introduced lately, they assert to be iron-clad; but the pear, like many other fruits, have sometimes defective anthers, stigma and pistils, which do not fertilize for want of pollen; hence it is safer to plant several varieties alternately for pollenization.

The Bartlett and Clapp's Favorite being early, invariably bring a good price, particularly the first named, yet the winter pears, if kept in a dry and cool cellar about 45° F., and offered for sale at Christmas and New Years, usually bring a remunerative price. I never sold any pears at home for less than $1.50 to $1.00 a bushel. There are in Missouri thousands of acres of land to be had for a trifle, where pears could be grown safely, surely, and afford not only a good and honest living but an ample reward to any one energetic enough to try. Nor does it require a great capital to start a pear-orchard; a few dozen pear-trees and one dozen quinces for raising plants to be budded is all that is necessary.

How to handle, gather, assort, pack and market the fruit has been treated exhaustively before and will not be repeated here to the detriment of your precious time.

DISCUSSION.

R. J. Bagby—I think we had better leave the Longworth alone. It has been given up where tried in Central Illinois. It drops from the tree before it matures.

L. A. Goodman—I think hundreds of trees have blighted and failed in Missouri, because they were upon LeConte roots.

S. Miller—I would not let a man plant trees with LeConte roots upon my grounds. If I had them growing upon my grounds I would dig them up. Of eleven trees planted some years ago I have not a vestige left.

Mr. Gilbert—How can we tell by looking at the trees what kind of roots they have?

Mr. Bagby—No reputable nurseryman will sell trees in this State upon LeConte stocks.

Mr. Gilbert—But how is the buyer to tell by the trees themselves? All nurserymen may not be reputable.

Mr. Goodman—The LeConte roots have a few long prongs almost without fibers. We have a great many poor men in the State who don't want to be humbugged. They depend upon the reports of this Society for information.

Mr. Polster—We have LeConte pear trees from Pary of New Jersey six or seven years old and no blight.

Mr. Goodman—I can't explain. It is the only favorable report I ever had of the LeConte.

Mr. Bagby—We have tried it upon Japan, French, and its own roots. It is reported unfavorably everywhere.

Mr. Goodman—I call your attention to another matter: fertilization of the bloom of the pear. Some varieties fail to fertilize themselves. It is well to plant a number of varieties near together, so that they can fertilize each other. I know trees 10 or 12 years old in orchards that have never fruited. Keiffer and Garber are said to be self-fertilizing.

S. Miller—As to the quality of the Garber: I believe I was the first to fruit it in this State. I did not consider it better than the Keiffer. Now, I will take that back since I have learned how to properly ripen the Keiffer. The Garber is three or four weeks earlier than the Keiffer. The trees grow right up. They ought to be headed back. The fruit of these varieties takes the place of the quince, which does so poorly in this State. If I was planting 1000 trees, I would plant 500 Garber and 500 Keiffer. The Krull from Mallinckrodt, of St. Charles, is a good winter pear ; I have kept it until spring.

Mr. Bagby—I can't tell anything about the Krull. It seems that the originator does not care to disseminate it.

S. Miller—I can't make a tree from its grafts. They fail every time. The original tree grows in a deep, rich soil. My trees are very poor growers. The fruit is good, but with me the tree is a failure.

Mr. Polster—I have 700 pear-trees three years planted in corn. What is the proper treatment for them now?

S. Miller—Sow it in clover, mow it and leave it on the ground.

L. A. Goodman—You don't want to cultivate it. If you keep cultivating you will be apt to lose your trees.

H. Schnell—I would cultivate four or five feet around the trees to keep mice away. I spade up around the trees in the spring, and in midsummer cut every weed with a hoe.

J. C. Evans—Have the blue-grass in pasture; it gets too hidebound for the good of the trees; don't want it in the orchard.

Mr. Gilbert—I picked a bushel of fine pears from a five-year-old tree in heavy blue-grass. It is well sheltered by building, and had ashes all around it.

Mr. Goodman—Mr. Polster's raspberries are checking his trees, for the raspberries are taking the best of the plant food in the top soil.

J. C. Evans—Use common sense. Get a good early growth and don't starve your trees to death nor push them too rapidly. I fear that some of our people will get fooled by this calomel remedy for blight. I had tried that remedy before Dr. Hensley told of it. I tried it on over a hundred trees. In 12 months every one them was dead. I don't believe it is a good remedy. I don't believe there is any remedy. I don't know whether the trees were killed by the calomel or whether they would have died anyway. Every tree to which I applied it was somewhat affected by blight; I skipped no trees.

Spraying:

Miss Murtfeldt—It is generally considered that the Codling moth can be thoroughly conquered by judicious spraying. Spray after the fruit is set, and again two weeks later. It is useless to spray after the fruit turns down. The prejudice against spraying is being overcome. Not much can be said in regard to peach spraying. Paris green is apt to scorch the foliage; it scorches the foliage of plums, too, to a certain extent. Some friends claim that it preserves the plum crop.

S. Miller—I tried it, but with no success. I ruined the foliage, and could not see a particle of difference between the sprayed and the unsprayed trees.

Mr. Espenlaub—I am satisfied that spraying the grape will keep down the mildew and black-rot.

D. A. Robnett sprayed 10 or 12 times against grasshoppers with kerosene emulsion, but it did no good.

S. W. Gilbert sprayed his peaches in the spring when they were the size of peas; sprayed four rows, waited 10 days, then sprayed eight rows; waited a week later and sprayed six rows. Those sprayed first lost a little foliage; the second spraying lost one-half the foliage and some fruit; the last six rows sprayed lost every leaf the spray touched and four-fifths of all the fruit. I used 4 lbs. sulphate copper, 4 lbs. lime and 4 ozs. Paris green to 50 gallons water.

Mr. Goodman—You used four times too much Paris green. Four oz. is altogether too much. Two oz. is enough for apples, one oz. for peaches. Test your mixture a day or two beforehand and see if it will injure your trees. Friend Gilbert lost $1000 by his experience.

Mr. Gilbert—The bulletins I had read said they had used the dilute Bordeaux mixture with four ounces of green to 50 gallons without injury to trees. There is something wrong there. The older the leaf the greater the injury. I don't believe that six ounces would kill the leaf just out of the bud. You have to wait till the sun shines to see what effect your spray will have.

Miss Murtfeldt—The young leaves are somewhat protected by a kind of varnish, so they are not so easily injured as older ones.

Mr. Espenlaub—I think many authorities have come to the conclusion that they have been recommending too strong mixtures.

Prof. Whitten—Our season was very rainy, and there was hardly enough fruit to make a test. My experience would recommend for the apple, four pounds copper, four pounds lime, 50 gallons water. For the peach and plum, one-half as strong, with one ounce of Paris green. I tried only one plum and one peach tree; some of the leaves dropped. In case of the pear, there was perceptible benefit. There is very little good in spraying kinds of apples the calyx of which remains closed. The trees we sprayed were old and weak. It could hardly be called a fair test. The spray was of some benefit in preventing rust of the leaf.

C. A. Keffer—The past year I sprayed grapes; I first used one pound blue-stone to 10 gallons of water; with this we sprayed vines and trellis before the leaves opened. Afterward we used one pound blue-stone and one pound of lime to 22 gallons of water. This mixture was used five times and proved very decidedly beneficial. This mixture is very much cheaper than the regular mixture. On the vines of one of my neighbors not sprayed and not much pruned, the amount of rot was so great that the crop was practically worthless; some varieties are very much more subject to rot than others. Those sprayed five times were better than those sprayed three times. The rains were frequent; sometimes in ten days hardly a trace of the spray remained. The foliage of the sprayed vines was very much better than that of the unsprayed. It enables the vineyard to mature its wood.

I never saw a peach on the tree till two years ago. At Columbia we have only one or two trees of a kind, and I don't know the varieties; certain varieties seem to be almost free from disease. One tree sprayed five times gave a very fine crop almost entirely free from rot. The weak mixture we used did not seem to harm the foliage. One pound of Paris green to 240 gallons of water did very slight damage, of no account at all. We sprayed apples with one pound of green to 160 gallons of water. This was not successful; the apples were wormy.

Mr. Kaiser—I appeal to the President of this Society to give us a summing up of this spraying business—what is known.

J. C. Evans—I cannot do it and I don't believe any other man can. The results often seem contradictory and uncertain.

FORMULÆ FOR INSECTICIDES AND FUNGICIDES.

(*Given by Miss Murtfeldt.*)

KEROSENE EMULSION.

Make a soap solution of half a pound of soap to a gallon of water. Heat it to the boiling point and remove to a distance from the fire and add two gallons of kerosene or coal oil, which need not be of the most refined quality. Churn or stir it vigorously, or pump rapidly through a force-pump for five to ten minutes. When used as a spray for foliage, add 10 or 12 times as much water and thoroughly mix. When applied to the trunks of trees as a repellent against borers or for scale insects, or to cattle to keep off horn-fly, use only one-half of the above quantity of water.

PARIS GREEN OR LONDON PURPLE IN LIQUID SUSPENSION.

One pound of the Paris green or London purple thoroughly interfused through 150 to 300 gallons of water, and applied to trees, grape-vines, shrubbery, in as fine a spray as possible.

For potato beetles and other insects on low-growing plants, mix the poison with from 20 to 30 parts of flour or air-slaked lime, and apply through a fine sieve.

WHITE HELLEBORE TEA.

For use on rose slugs of all sorts, currant and gooseberry worms and all saw-fly larvæ, use the above, prepared as follows: To one gallon of boiling water add one table spoonful white hellebore, in powder; let it stand until cold, and apply in the evening with a fine sprinkler or whisk broom. Make a second application in a week or ten days if there has been much rain in the meantime, or if the insects are not all killed by the first application.

For cabbage worms of all kinds use hot water, 130° Fahrenheit, or pyrethrum powder (California Bubach) diluted with six or eight times its bulk of flour or air-slaked lime, or dust the plants thickly with corn meal, bran or mill feed.

BORDEAUX MIXTURE.

To every 10 gallons of water add one pound of lime and one pound copper carbonate (blue vitriol). Dissolve these separately in hot water and mix when cool.

AMMONIACAL COPPER CARBONATE SOLUTION.

Dissolve one ounce of blue vitriol in six ounces of ammonia and dilute with 10 gallons of water. Either of these fungicides may be combined with Paris green by simply adding them in the above proportions to the amount of water in which one pound of the green is suspended. It is claimed that the action of Paris green, while equally effective as an insecticide, is, when combined with the fungicide, much less liable to injure foliage.

For all powdery mildews simply dusting with sulphur is a remedy.

SPRAYING ORCHARDS.

The following summary of a series of experiments made at Cornell by E. G. Lodeman will give every one wishing to spray their orchards some facts of value:

The Bordeaux mixture was as follows:

Copper sulphate	6 lbs.
Quick-lime	4 "
Water	40 gals.

Cost, 1 1-5 cents per gallon.

The ammoniacal solution was as follows:

Carbonate of copper	1 oz.

Ammonia enough to dilute the copper.

Water	9 gal.

Cost, 1 cent per gallon.

Paris green	2½ oz.

Quick-lime, ½ lb was added to the ammoniacal solution of 40 gallons.

Paris green, 2½ oz. to 40 gal. of Bordeaux mixture was added and the following results are deduced from the series of experiments:

CAUTION.

Before any one uses this strong solution I would advise a thorough trial first. I am positive that in our bright sunlight injury will follow to the foliage, and fruits also, I fear. If the solution of either is used much more diluted, it will accomplish the same purpose and there will be no danger of injury.

I would recommend the use of the following, as being much more safe and just as efficient:

Bordeax Mixture (diluted):

Copper sulphate	4 lbs.
Quick-lime	4 "
Water	50 gal.

For apples, pears and quinces, use Paris green, two oz. to the above mixture.

For peaches and plums and cherry, use Paris green, one oz. only to the above mixture.

From the results of all these experiments, I am sure that the Bordeaux mixture is the best fungicide, and I am also sure that Paris green is the best insecticide; therefore I would advise the use of the above as being safe. But it is best for every one to test his own pump, plan of mixture, strength of material used, and fineness of spray, and then note the results on some bright, sunshiny day.

L. A. Goodman, Secretary.

SUMMARY.

1. Pumps used in spraying orchards must have a large capacity in order to be economical of labor.

2. Automatic agitators have not given satisfactory results.

3. That spraying may be facilitated, the trees in an orchard should be planted far enough apart to allow of the passage of a wagon when the orchard is in full bearing.

4. The amount of liquid required to spray a full-grown apple-tree is about four gallons.

5. The number of applications necessary to protect apples from the scab fungus cannot be definitely stated As a rule, it may be said that a fungicide should be applied at least once before the trees blossom, and two applications are necessary after the falling of the blossoms, upon those varieties which are habitually injured by scab to any serious extent. Upon many susceptible varieties, one or two additional treatments are advisable. Only one or two applications may be applied with profit to resistant varieties.

6. The advisability of making more than one or two applications of fungicide to Baldwin and Fallawater apples is doubtful. King, Maiden Blush and Fall Pippin apples will repay four and possibly six applications. Red Astrachan can also be profitably treated three times.

7. Bordeaux mixture proved to be by far the most effective fungicide of those used. Following the Bordeaux in the order of their value are the ammoniacal solution of copper carbonate, Paris green, Fostite.

8. No preference can be given Paris green or London purple in regard to their insecticidal value, provided they contain an equal amount of arsenic.

9. Two applications of the arsenites are sufficient to control the ravages of the first brood of codlin moth larvæ. The financial gain derived from later application may be doubtful.

10. The arsenites and fungicides used in the apple orchard appear to be equally effective whether applied alone or in combination.

11. Paris green and London purple, if applied more than once or twice to foliage, may do serious damage unless their caustic action is neutralized.

12. Lime greatly reduced the caustic action of Paris green.

13. The foliage of varieties of apples susceptible to the attacks of apple scab was kept in a healthy condition by applications of fungicides.

14. The size of Fall Pippin apples was practically doubled by protecting them from the attacks of the apple-scab fungus.

15. The use of fungicides may intensify the color of apples.

16. The keeping qualities of Fall Pippin and Maiden Blush apples were apparently greatly augmented by the applications of Bordeaux mixture which were made to reduce injury from scab.

17. The market value of sprayed apples was increased at least $1 per barrel by the applications made during this season.

18. Bordeaux mixture, when applied to peach-trees alone, or in combination with London purple, did not injure the foliage.

19. The ammoniacal carbonate of copper is very injurious to peach foliage, but the solution may be rendered less caustic by adding lime, The addition of Paris green can then also be made with comparative safety.

20. Neither Paris green nor London purple should be used upon peach-trees, unless the mixtures are very dilute, or lime is added to neutralize the caustic action of the arsenites.

21. Fostite gave only negative results when applied to peach foliage.

22. The Bordeaux mixture, when properly applied, practically protects the foliage of apples, quinces, dewberries, raspberries, blackberries and gooseberries from fungous attack.

23. Copper chloride can be used as a fungicide to advantage when the solution is so strong that lime is required to neutralize its caustic action. On the whole, it is a promising fungicide.

* * * * * * * *

40. On the whole, therefore, I recommend that growers adhere to Bordeaux mixture in combating fungi, or ammoniacal carbonate of copper may be used as a second choice, in case the Bordeaux cannt be applied with facility. Paris green and London Purple are still the best general insecticides; and the greater value seems, in general, to reside in the Paris green. E. G. LODEMAN.

DISCUSSION.

Mr. Wilcox sprayed 25 acres of clover for grasshoppers in his orchard. It killed many.

Henry Schnell—I put young chickens in my garden where the grasshoppers were worst. In a few days they had thinned them out.

For three seasons I have not been able to get a stand of fall spinach on account of the grasshoppers. I put my chicken coops by the spinach, but the grasshoppers got it.

J. H. Marion—I have been informed that the kerosene emulsion will kill them.

Mr. Kirk—I set my boys to shaking the grasshoppers from the trees. They left the trees and got on the corn planted between them. Some replants in an old orchard were nearly killed. Another remedy was turkeys. I have seen turkeys come to the house so satiated that they would not touch corn.

Mr. Kaiser—Thirteen rows of Ben Davis apple-trees in my nursery were literally ruined by the grasshoppers. The trees in a young orchard beside a pasture were ruined as far as the grass extended. Where we had grown beans they were not hurt.

D. A. Robnett—I had some 3000 trees damaged. The part of the orchard in which the clover was mowed in June produced a second crop of clover, which saved the trees, where the clover died down and smothered the young clover. I tried everything that smelled bad and tasted bad, but all did no good. Fifteen acres I plowed came through all right.

A. Nelson—A man I knew had a 200-acre Ben Davis orchard sown to oats. After harvest, before he knew it, the grasshoppers had taken possession of his orchard. He used a solution of carbolic acid and washed the trees as high as he could reach. I noticed a few days ago those trees were in full foliage.

J. L. Erwin—I have noticed that land upon which poultry runs is to a great extent free from grasshoppers.

H. Schnell—On my one-half acre vineyard the grasshoppers had begun to cut the bunches off. I put 30 chickens in one corner of the vineyard. They soon stopped the hoppers from cutting the grapes.

Secretary—Plowing and cultivating are the best means of getting rid of them, and the most practicable remedy I know of. Corn in the orchard is the next best.

Mr. Kirk told of the sudden disappearance of the green cabbage-worm from his farm upon the advent of another insect, which could not be identified from his description.

To prevent the Horn-fly from annoying cattle, Dr. Porter recommended coal-tar diluted with turpentine and applied with a small paint brush.

L. L. Seiler, of Lake Charles, Louisiana, being present with a fine exhibit of oranges, quinces, Japan persimmons, sugar-cane and other products of his section (Southwest Louisiana), was given time to speak of his locality. He spoke at length of the advantages of Southwest Louisiana for sugar-cane, rice, cotton, fruit and vegetable growing. Their climate was greatly influenced by the Gulf stream, which at that part of the Gulf coast came nearer the shore than at Galveston or New Orleans. Calcasieu Parish is heavily timbered in the north, and mostly prairie in the south. He claimed the finest climate on the continent, freedom from storms that devastated some parts of the Gulf coast.

Rice is one of their principal crops. In 1885 only one self-binder was used to harvest the crop. In 1893 the manufacturers could not furnish the machines needed. Much rice is grown on upland, without covering with water. A man with a good team, if he is a worker, can raise 100 acres of rice, sowing from March to June, and having four months to reap the crop. Sugar cane will make 20 or 30 tons per acre, and sell for $4 per ton at the mill.

Another commercial crop is sweet potatoes, which produce from 100 to 200 barrels per acre, and are worth just now, at harvest time, $1.25 per barrel, but soon get to $2 per barrel.

Everything in this part of the State had been in the hands of the natives till a few years ago. The Acadians had taken especial pains not to let the world know the advantages of the country for fear somebody would drive them out of it.

He spoke of the fig, orange and pear as very profitable crops.

The pecan comes into bearing at 6 or 8 years of age, and increases its crop rapidly to $1000 per acre.

The strawberry produces fruit from the last of February to the middle of June.

Grapes are very productive and profitable.

FRIDAY, December 8, 2 p. m.

New Mexico—

J. H. Bailey from New Mexico had a fine exhibit of smooth, perfect apples. Time was given him to state the advantages of this country. He said they could grow by irrigation all the fruits of a temperate climate. They have no dew storms—but little rain. In winter they have white frosts from the last of November to March. He spoke highly of the country as a place for invalids seeking health. In summer it is hot in the sun, but cool in the shade.

CULTURE OF CELERY.

HERMAN SEAVER, JENNINGS, MO.

One ounce of seed will produce about 3000 plants. It takes deep light soil and well manured and plenty of water to grow celery. Sow in May in open ground and rake the seed in lightly; water and shade from strong sun.

When the plants are about two inches high, transplant in rows about three inches apart to make the plants strong. When the plants are about three inches, prepare trenches four feet wide, six inches deep; bank the ground on both sides; trenches must be eight feet apart. When the soil is poor, make the trenches about a foot deep; dig into the bottom plenty of well-rotted manure, and set the plants four rows in trench and nine inches apart in rows. Keep them shaded until started well; water every day after sunset; hoe often and keep free from weeds. About last part September gradually earth them up as they grow. Press the stalks closely together; press the earth tightly to the stalks to make them bleach; no more water needed after earthing them up. For winter use cover them up before frost, about two inches earth and light manure.

TRUCK FARMING.

BY J. H. KARNES.

Mr. President, and Ladies and Gentlemen of the State Horticultural Society:

The subject assigned me for a paper at this meeting is, "Truck Farming as an Adjunct to Orcharding."

There are so many conditions which tend to the success or failure of such undertakings, that I shall only have time to treat lightly of some of the principal items which constitute some of the profitable adjuncts of the orchardist. I take the position, first, that thorough shallow cultivation is the method to adopt to bring about such conditions as will be most conducive to the healthy growth of the young orchard, and to cultivate such vegetable crops, in the orchard, the cultivation of which will most nearly attain to the above conditions, and at the same time yield a profitable revenue. But you must also have some of the conditions necessary to conserve the objects to be attained. And a good soil contiguous to a good market is one of the most necessary conditions.

Now we will only mention a few of the principal items which we have cultivated with success and profit. But first you must be sure to select such varieties only as will yield the largest crops of the best qualities of vegetables. As much depends on varieties in vegetables as in fruits. By quality, I refer more to shape and color than to real table quality. Then with well-selected varieties of sound seeds and a good natural soil, or a soil made good by fertilization, you may reasonably expect good results, if your efforts have been well directed, and you have been assisted by nature in the way of rains and sunshine.

FOR THE CANNING FACTORY.

In the way of small vegetables for early planting we mention peas, beans and egg-plant. But I have ceased raising these because they ripen too near to the season of berries, and because of the slow process of picking and preparing for market. Then of the larger crops: If you are contiguous to a canning factory there is nothing more profitable as a revenue producer, and no crop grown that will produce a more healthy growth in the young orchard, than the tomato. Our canning factory pays 20 cents per bushel of 60 pounds.

The tomato on good soil with good tillage seldom ever yields less than 200 bushels per acre, and two years ago I gathered 400 bushels from three-fourths of one acre. The best varieties of the tomato for retail trade are Livingston's Beauty and Dwarf Champion. For the canning factory are Matchless, Ignotum and Stone.

EARLY CABBAGE AND CORN.

Early cabbage is also a profitably adjunct to the person raising a young orchard, especially if you succeed the crop of cabbage with a crop of sweet corn. The cabbage will produce from one to two hundred dozens of heads per acre, which usually sells in our market at from 20 to 40 cents per dozen. Then the sweet corn is readily and easily sold at from five to eight cents per dozen. Besides you obtain a large amount of the very best of feed from the fodder. But these crops are for the smaller orchardist who are located near to the larger markets and canning factories. Now we will mention some crops that may be raised with profit by the larger orchardist who are located near a small railway station, but whose shipping facilities are good.

THE POTATO.

The potato can be raised on a large scale in very many localities, and it is the king of the vegetable kingdom and one of the staple articles of food. It is easily cultivated, and often yields very large crops, which are easily and readily sold in either a near-by or foreign market at prices that bring you a handsome revenue. The potato-vine also furnishes the young orchard with the best and most cooling and moistening mulch that is possible to obtain, and just at a time of year when it is most needed. To show you the vast importance of selecting good varieties, it is only necessary to relate some of my experience this year:

The Early Ohio yielded 130 bushels per acre, which I sold for 50 to 68 cents per bushel. Lee's Favorite and New Queen each yielded at the rate of 250 bushels per acre, all of which I sold at 60 cents per bushel in the field. The Burbank seedling (which is always quoted higher than any other potato in the markets and in some localities, especially in the north, produces the largest crops) only yielded 50 bushels per acre. And the tubers are small and knotty, and hard to sell at 35 cents per bushel.

THE WATERMELON.

I will only mention one more vegetable which has proven a profitable adjunct to my orchad, and that is the melon crop. "O dat water millon!" Mr. Chairman hundreds of acres are planted in many parts of this fair land of ours. It is one of the luxuries we can little afford to be without. But alas, the high rates of transportation, the elements and the striped bug often seem to conspire to defeat our best-directed efforts and to rob us of our profits.

The last of these enemies, the bug, is easily combated and conquered by the use of flour of sulphur, sprinkled at the roots of the melon vines. But the soulless corporation and the elements are the things over which we have no control, and to which we must submit with as much meekness and grace as possible.

Yet we have known a person to get a net income of $60 per acre, besides a splendid growth of wood on his young apple-trees, by raising the watermelon. But I will not trespass longer on your valuable time, for I think I have already shown conclusively that, as an adjunct to the orchard, truck farming is a profitable adjunct to fruit growing, and I will only add the following conclusions: You will notice the crops I have mentioned require the cultivation most suited to the young orchard, furnish the most and best and cheapest mulches, and at the season of the year when the mulch is most needed. Then, Mr. Chairman, if the crops we raise were not profitable in a cash point of view, we are amply repaid for our labor by securing the best possible cultivation for our young orchard.

> "Then take my advice ; it is good and it is true ;
> But lest there be some of you doubt it,
> I'll whisper the secret, now, seeing it is you,
> I've *tried* it, and know all about it."

GARDEN VEGETABLES.

In these busy days of scientific research, when so many knotty problems are presenting themselves to the horticulturist, and when each year sees so much to be done toward the solution of these problems, have we still a little time to consider that simple adjunct to the rural home—the kitchen garden?

It may seem that enough has already been said and written upon this subject, urging every one to have a garden. Almost every class of healthy-minded individual has tried gardening, and a great many of them have given their methods.

Experience has been handed in from every quarter. The professional have tried it for recreation, the invalid for health, the poor for sustenance, and the scientific to satisfy curiosity and thirst for knowledge. Even the humorous Charles Dudley Warner and his toad have done their part, that our knowledge of garden management may be increased.

I have not referred to the writings of this humorous gentleman just to make you smile. I believe he has taught us a lesson that most writers have entirely overlooked. He pictures so vividly the fun of the different operations, such as getting up in advance of the sun to sprinkle ashes over hills of cucumber stumps, gnawed almost to the ground by the festive flea-beetle and so called squash-bug, and enumerates sundry other comforts of the home where the garden is. He shows you how it is quicker to plani your garden on soddy, ill-prepared land than to stop to work the clods out when your seeds ought already to be germinated. Then he paints, so truly, the mid-summer condition, where poor, weak plants are doing their best to get out between the sod, and despite all your efforts and back-aches in a scalding sun, you can't keep down the burdocks and fire-weeds that delight in sod and grow strangely productive.

In short, he goes far toward exploding the commonly accepted theory that every one should have a garden, and leads to the conclusion that a vegetable patch is not, necessarily, a thing of beauty or a joy for ever. So the lesson I would learn, Mr. Warner is to hesitate before urging every one to have a garden. I am convinced that some of us have not the time to properly prepare one, or to maintain continual contemplation of the numerous ills that blast our cauliflower and our hopes, if we are not ever on the alert to prevent, rather than cure, their effects.

If one concludes to have a garden, it pays to have a good one—not a large one, but a good one. A small piece of land well drained, well fertilized, thoroughly and deeply worked, and covered at all times with some growing crop, is the ideal. This necessitates always having on hand some plants of the proper kind and size, or perhaps some seeds, to take the place of each variety as it is removed. It is better to rotate crops on a small area, by succeeding early crops with late ones, than to cultivate a larger space, and devote each portion to but one variety for the season.

Just so many sorts should be selected as can be properly cared for. The number of well-known and commonly cultivated vegetables is large, and it is seldom we see a garden that contains anything like a complete list of even the most useful sorts. The list of kinds grown should each year be increased. It is not best to try too many new sorts all at once, without a very definite idea of their culture or their uses; but each new vegetable tried should be made a study until it can be successfully grown and used. In this way a great many vegetables that we have formerly appreciated but little are brought into favor and become almost indispensable.

Attention to the varieties of each kind of vegetable is also important. Formerly much less attention was paid to originating strains which possess certain fixed qualities than is the case today. With some growers, even a cucumber was a cucumber, and a tomato was a tomato, regardless of the qualities possessed. Now, however, the trade demands that the seedsman select his varieties according to a fixed type, so the buyer may procure seed with reasonable certainty of securing the qualities desired. Seed catalogues should be studied and compared, not for the purpose of grasping every novelty that appears, but that those sorts generally recognized as standards may be selected for general planting.

In this paper it is impossible to give anything like a detailed account of the culture of all the different kinds of garden vegetables, and I am sure my hearers will appreciate me more when I say I shall not attempt it. There are, however, a great many simple methods, involving very little trouble or expense, by which most home gardens might be made useful beyond their present capacity. These methods may not be entirely new and startling; in fact, each person present may know them, and yet, what we know may lie dormant in our minds and not be put into actual practice unless our memory is jogged occasionally.

Asparagus is indispensable in the complete garden, because it is ready for use at a time when no other out-of-door crop could take its place. It is quite generally grown, but its producing period, instead of being the customary few weeks of early spring-time, should be made to cover several months.

A bed once prepared may last a life time, so it is well to give it the best of preparation. Seeds should be selected in autumn from large strong plants, and kept in moist sand over winter, as they germinate more quickly if not allowed to become too dry. They should be sown the last of April in shallow drills, and thinned and cultivated the first season much like onions or other small annuals. In one season they should become large enough to remove to the permanent bed.

The land should be deeply worked. Best general results may be expected from a sunny location, but if part of the planting can be on high ground and part in a low cooler place, it facilitates the production of both early and late plants. The main planting should be set with the crowns six or eight inches below the surface, but for early product part of the plants should be only two or three inches deep. The deeply-set plants should be only slightly covered at first and the soil drawn up around them as they increase their growth. The distance apart to set the plants may be varied to suit the kind of cultivation desired, bearing in mind, however, that for best development the hills should be at least two feet apart each way. The plants should not be cut for use for two years after the bed is made.

Well-decomposed barnyard fertilizer is no doubt best, and should be applied in liberal quantity. A thick dressing of it thoroughly worked into the soil each year maintains that fine tilth which allows the stems to make a symmetrical upward growth, and enables the picker to break off the entire bleached, succulent growth deep below the surface.

In the garden we have three beds of this plant, which this year produced fine succulent stems from February 26th to the last of June. As soon as the plant withered in autumn, a part of one bed was heavily dressed to retain the warmth of the soil. In midwinter this dressing was removed, an ordinary hot-bed frame was placed on the bed, and the soil enclosed worked up loose and fine. The frame was then half-filled with fermenting horse manure, and banked to the top on the outside with the same material. Hot-bed sash were then placed over the frame. In about five weeks the plants began to come through, and continued to be produced until warm weather.

Rhubarb may be forced in much the same manner as asparagus. A barrel with each head out, or any such frame, may be set around the root, and fermenting manure used around it the same as in forcing asparagus. The barrel or frame should be kept covered to retain the heat. Light is not necessary. In the greenhouse we force both these vegetables under the benches, but have not had so good results with asparagus as when it is forced in the open ground.

Lettuce is an important factor in every garden during early summer. Have you tried growing a sash of it in late winter or early spring? It may be done in sufficient quantity for the table without a green-house or even a hot-bed. A frame should be set, in autumn, in some sheltered, sunny position. It should be well banked up, and covered with sash to retain the heat that is in the soil. If no other seed-bed is available, a flower-pot may be set in the plant-window of the house, and the seedling started in it. They should be transplanted to the frame when their fourth leaf is starting.

At the garden, during February and March, a frame of this kind gave better results than did the green-house. The green-fly, or Aphis, that indoors necessitates frequent fumigation, was avoided, and the plants were even more crisp and tender. The principal difficulty was the check the young plants received in being moved from the green-house, where the seeds were started, to the cold frame, and this was largely avoided by placing the box of seedlings in the frame during the day and back in the green-house at night for the first week, to gradually accustom them to the change.

Of course, by converting this frame into a hot-bed, such plants can be grown at any time, even during the shortest days in winter, when the influence of the sun is not strong enough to properly warm up the cold frame. Some of the best varieties of lettuce are Gen. Grant and Denver Market. In a hot-bed, where rapid growth is insured, the Butter lettuce is as good as any we have tried. Moist, heavy soil is the best.

Egg-plant is a vegetable that sometimes does not give so good results as might be desired, largely, I think, for two reasons: its liability to insect ravages, and the fact that it requires a high temperature. The flea-beetles, and other insect enemies that skeletonize the leaves, may be gotten rid of by dusting the plant with white hellebore. The plants should be started in the hot-bed, and not transplanted to the open ground until warm weather is well advanced.

Kohl-Rabi would be more generally grown if its good qualities were rightly appreciated. It is best early in the season, as, like all the cabbage group, it likes cool weather. We plant the first crop of it in hot-beds in March, set the plants in the garden early, and cultivate just as we do early cabbage. Frosts must be quite severe to injure it. The thickened stems should be used while tender, before they reach full size.

Of the tomato I will say but little, as everyone recognizes its importance. It is a mistake to suppose that the mammoth fruits that often find preference in the market are necessarily the best. On the table, the compact fruit of medium size is much more satisfactory in every respect. The Early Ruby is one of the best very early sorts, and for main crop the Dwarf Champion can hardly be excelled. The past season we secured very good results by pinching off all lateral branches as they appeared, and training the main stem to a stake. This method admits much closer planting, and brings the fruit up off the ground, where it gets the sun and is less liable to decay. When time for frosts arrives, the remaining green fruit may be, for the most part, ripened by pulling up the plants and placing them in a basement or almost any warm place. In this way ripe fruit may be had until the last of November.

Parsley may be had for garnishing meats during the winter by taking up the roots in autumn and setting them in pots or boxes in the light of the cellar window. Grown in this way, the leaves have a half-bleached, silver-tipped appearance that adds to their attractiveness.

I have passed, unmentioned, a great many of the most useful garden vegetables, simply because they are almost always grown, and their culture is too well known to be dwelt upon.

One other thought comes to mind. How easy it is, in the busy months of autumn, for vegetables that are being stored for winter to become damaged. Potatoes exposed to the light become green and bitter, and often the root crops wither for lack of moisture or decay from having too much of it, while vegetables in pits quickly mould if not watched and ventilated. It is not always possible to absolutely control conditions of light, heat and moisture, but it is well to call to mind the fact that uniformity in regard to these should be sought.

J. C. WHITTEN,
Mo. Botanical Garden, St. Louis.

UNDER-DRAINAGE AND IRRIGATION.

BOLTON, HARRISON CO,, MO., Nov. 20, 1893.

Mr. L. A. GOODMAN, Secretary:

As I promised you a paper on "Under-drainage and Irrigation," I will do the best I can to make the subject plain.

My farm is what would be called hilly—about an average of North Missouri land. I have 400 rods of ditching. None of my land was ever too wet for corn of a common season.

My ditching was not to redeem wet land, but it was to improve the best land that I had, and the improvement is far greater than I thought of; in fact, it gives better returns than any other work ever done on the place. My outlay has been $108. It has given me running water for my stock constantly for 15 years, and for 10 years before that we only had to draw water of a very dry time—a part of the ditches now having been in operation 25 years.

We have 300 rods of ditching to prepare a garden-spot of 1½ acres. The garden produces, on an average, $600 worth a year. We sell from $200 to $400 out of the $600. We have no way of knowing the precise amount of gain caused by the ditching. We believe the garden produces one-third more by being ditched, which would be $200; allowing $100 for picking and marketing, leaves a net gain of $100, and the stock water is worth more than $8 a year, so we will credit the ditching with 100 per cent on the investment.

The garden is 80 rods from the creek, and is 80 rods from the top of the hill. It has a middle altitude; is 50 feet higher than the creek, and is 50 feet lower than the hill-top. From the center of the garden to the top of the ridge, on each side, it is 30 rods. So it receives the surplus water and the soil that washes from the 30 acres.

My garden is like a large pond made in a draw; the embankment 16 feet high in the center, 280 feet on top of the bank, from one ridge to the other, and this pond filled with sand and soil, with a good drain under the center. The drain is now 16 feet below the garden, so the water, as it runs through the tank, does not freeze over. This one ditch, covered as above described, would make a complete artificial spring that would water 200 head of stock of a dry time, and the garden would be dryer than common hill land.

In order to have my garden more complete, I cut four ditches from side to side, across this a center ditch; then cut two, one on each side of the garden, crossing the outer ends of these four—all being three feet deep. The two side ditches are 200 feet apart where they cross through the bank at the lower end of the garden. They are left open, and the water running out about half the time; but when irrigation is needed, they are closed. They run together at the upper end of the garden and connect with the irrigating ditch.

The system of irrigation is formed just as the one described to form stock-water. The deep ditch in the center of the garden is 20 rods long; the one for irrigating is 30 rods. They were made eight feet deep at the start. The water did most of this digging—a shallow ditch being made with the plow to give it a start.

We use coal slate broke fine instead of tiling; the pieces for covering are used as large as the ditch will permit. The joints will break. Gravel covered with coarse sand, I think, would do as well.

There was no tiling to be had when I commenced ditching, so I learned to do without it.

Those wishing to obtain a full supply of stock water in a short time should cut their first ditch on a perfect level with the bottom of the water tank, so it will serve as a reservoir, and should be filled as high as the water will stand in the tank. From the tank back to the upper side of the dam there should be a one-inch gas-pipe used, with a stop to regulate the stream to the proper quantity for use.

There should be perforated iron surrounding the upper end of this pipe, and this covered with gravel. If tiling is used in the rest of the ditch, it is best to cover it with gravel or slate broken fine. A small tank keeps the water of a more even temperature than a large one.

We have used no manure on the irrigated ground, but things have grown very fine. One hill of Iron-clad watermelons produced 800 pounds—the largest weighing 65 pounds and the smallest 27 pounds; 21 melons in all.

One sweet-potato plant set out June 5, 1893, and dug October 14—potatoes weighed 36 pounds.

I planted a fine yearling Concord grape-vine March 28, 1891; it ripened three bunches of grapes the same season; in 1892 it ripened 12 bunches, and in 1893 it ripened 352 bunches of fine grapes. Clean culture, but no manure. It had 16 feet of drift soil, and plenty of moisture; has come into winter in fine condition.

The proper drainage to draw the water from our public roads, and the proper damming with permanent stone walls to stop the ruinous wash that is now going on, is a matter that should be looked after immediately. There are ditches in this county that were started by the road overseers, that have cost the county hundreds of dollars for bridging. If the proper work of under-draining and damming had been done at the time of starting the open ditches, the cost would not have been 10% of the present cost. Grading and open ditching on hill land is not near so good as under-drainage with a smooth surface.

In the case of our garden, the water dug the center ditches for us, and when the drainage material was placed and the dam prepared at the lower end, the water washed in soil and filled them in less time than it took to dig them, and it kept on filling until it is nearly half-way to the top of the ridge or hill on each side. Why not adopt the same plan on our roads, and have the water to refill the ditches and grade our roads for us where bridges now exist; they might stand until the fill reaches them or even covers them. In some places it would be necessary to form a concave stone crossing for the water and the wagon-way, so that flood waters would not damage the road-bed.

In many places the men owning the land below and above the road could afford to help do the work for the sake of good running water below, and a good garden spot above.

If the plan was adopted by all men having suitable land, there would soon be good springs on every farm, and the now dry beds of our creeks would be living streams of pure water. The multiplied thousands of barrels of water held back would lessen our floods and modify our drouths, at least on the lands that held the reserve.

I will give a few items, not directly connected with the above, that may be of interest to some. Those wishing to raise nut-bearing trees may succeed by securing this year's seed as soon as they come into our markets and packing in wet sand till spring. Then plant where they are to grow. Red Cedar seed should be gathered before the 15th of January and placed in an open box, or something suitable to hold them, covered under ground 15 months; or, in other words, planted now, they will lay in the ground this winter, next summer and next winter, and will grow early the second spring. I have made two successful plantings after keeping the seed boxed under ground 16 months. If the weather is warm, Pine will grow immediately after planting. All yearling trees do better with partial shade the first season. My cedars of last spring's planting are now eight inches high. Some 2-year-olds are two feet high. It is difficult to get a good growth from the evergreen seedling from the northern forests. It is my desire that all may succeed in raising nice groves, wind-breaks, etc., and the foregoing remarks are for the benefit of those who want information, as I did a few years ago.

ISAAC M. NEFF.

SUCCESSFUL CELERY CULTURE.

BY JACOB STOCKE, ST. LOUIS.

To make a success in growing celery, two, three or four points must be carefully observed. The first point is in obtaining good seed of the varieties you wish to plant, and I will give you the names of three varieties as I value them:

1st, the White Plume; 2d, the Golden Self-blanching; 3d, the Golden Heart. The latter named being more hardy, should be planted, grown and cared for as a late variety for winter use. About the last of April or the first of May plant the seed in a well-prepared seed-bed, made rich and fertile with decayed or well-composted manure. After seed is sown in seed-bed, ground should be mulched with waste hops from the brewery, or very finely pulverized horse-manure. While the plants are growing in the seed-bed, your ground where you intend growing them should be thoroughly prepared, and if taken in hand the year before, so much the better. The ground should be very rich, either as new bottom-land worked deep and mellow, or else it should be good garden ground, highly fertilized and deeply worked.

Fertilizers should be thoroughly incorporated into the soil to a depth of from 12 to 15 inches. Thoroughly decayed barn-yard manure, or a compost made with the same, is the best fertilizer to be used in the successful growth of celery. I want to be understood, that as celery is so largely composed of water, it requires much moisture in the soil, naturally or artificially supplied, to make a successful growth; and unless extra care is taken in preparing a deep seed-bed, your celery growing will be as near a failure as possible. But to proceed with the planting. In the latter part of June or the early part of July, plant your celery in trenches four, five or six inches deep, according to how well you have worked your ground. In transplanting to the trenches, the roots should be kept moist, artificially, if necessary, and after your plants are well started in the trenches, if the season should prove dry, you must keep up a regular system of watering plants in the trenches, for in this one point your success or failure lies.

After your celery is up, with its heads above the trenches, or along about the last of September, you can begin to fill in the trenches; but if at that date the weather should continue to be hot, the work of filling trenches must be deferred until the weather begins to cool, even if you have to wait until October, as it will not do to fill the trenches until cool weather sets in. After your first filling in of the trenches level with surface, if no frosts come on, wait 10 or 15 days, then fill up to within an inch or so of the top of your plants. If then frost still keeps off, wait 10 or 12 days more, rounding up your earth nearly covering your celery entire, remaining in that condition until cool weather sets in, when it can be taken up, cleaned and trenched, and if kept from frost and rains it can be successfully kept until February, and I have kept it until the 1st of March.

In the last few years great advancement and progress has been made in the growing of this most valuable vegetable, and where five years ago one dozen bunches were consumed, today we find 100 dozen bunches are called for. Besides this, the medical fraternity are giving this vegetable much thought and attention, and many preparations are now on the market for the benefit of an ailing public.

DISCUSSION.

A. J. Blake—When I used to grow celery, I took up the plants before cold freezing weather, fixed a place in the cellar, covering the floor with about three inches of soil. I set the plants upon this soil, pressing the soil close around the roots. We sprinkled the celery once or twice a week. The house-keeper could get the celery when she wanted it without calling upon the men to grub it from the frozen ground in the garden. This is not theory. This I did. It is a very simple thing.

Prof. Porter—I have been growing celery and eating it for 40 years. For 20 years I lost two-thirds of all I grew, for the lack of some good way of keeping it in good condition. I first tried taking it up and packing in boxes with Sphagum moss. This spoiled the flavor of the celery. The best results were obtained by covering it up right where it grew; but it was often hard to get out when we wanted it.

I now grow White Plume, Golden Self-blanching and Golden Heart. I grow in rows five feet apart, banking only enough to keep it upright in position. Celery that I wish to keep for late use, I put three rows together, cover it well, well drained and put loose boards over it. What I want to get at during the winter, I put in a trench 4 feet wide and 18 inches deep. I set a row of 2×4 studs 4 feet high along each side of the trench and set rafters over it, cover the sides and top with boards, and then throw the earth up over all, and put on straw or coarse manure when severe cold weather comes to keep it from freezing. You must absolutely keep dirt from the heart of your celery, or it will speck and spoil.

S. W. Gilbert—I have a piece of ground shaped like a horse-shoe, containing 12 or 13 acres, that is low and wet; the outlet is narrow.

There are springs at the base of the hills surrounding the basin. Can I ditch this ground and make a garden of it that I can irrigate?

Dr. Porter—I would say from the description that Mr. Gilbert has a place for a fine garden.

J. M. Smith, of Green Bay, Wis., told me six years ago that he would not conduct a truck farm without means of irrigation. When a man can irrigate, he knows just exactly what he can depend on, and the results are certain.

J. C. Evans—As to spraying, my experience is little; my observation very extensive. I have been watching 15 years and I don't believe there is a man in the United States that can tell you when, what and how to spray. Different results from the same source are the rule. You have just to keep on experimenting as best you can. Mr. Gilbert destroyed $1000 worth of peaches by doing just exactly as he had been instructed by the Department of Agriculture at Washington.

Mr. Blake—They had this subject up in Illinois. There is difference in the strength of materials. They agreed to have some one to bring these poisons and test them so they would know just what strength they were, and not to bring from Tom, Dick and Harry. It struck me that it was a good point. What is the sum total of our investigation? It is failure and disaster; but we must still go along as best we can.

Dr. Porter—You can take two specimens of poison, and they will not analyze the same. The manufacturers cater to the demand for cheapness. An article of 90% purity cannot be sold as cheaply as one of 10%. One will burn the leaves and the other will have no more effect than water.

I want to speak as director of the State Experiment station. If you don't inform us of your wants, we have got to use our best judgment of what we think best. We want to work in the lines in which we can be of the most service to you. We have no theory at the Station. We are after truth. If truth is contrary to our preconceived ideas, so much the worse for the theory. You must not blame us if you don't call on us for help. I will analyze one-half ounce of Paris green for any fruit-grower who will send it, so that you may know the strength of your material.

The Board of Curators are asking for advice. This Experiment station don't cost the farmers one cent. It comes from the treasury of the United States. It is so much money paid to the State of Missouri for your benefit, but we can't use it for buildings. It was presumed that the State would furnish the necessary buildings and the lands. The lands were donated and cost no one a cent. Four years ago I set my head against running it for commercial purposes in competition with the citizens of the State. Honest and healthy criticism we invite.

There is a law in this State in regard to fertilizers. It is the duty of the manufacturer to have an analysis printed upon every bag sold in the State, send a sample to the station, and if his tag don't agree with my tag, he is liable to fine and prosecution. We are ready to help you in this way. We have a law, and if we don't protect ourselves, it is our own fault.

Mr. Blake—The law was engineered by a few, and was in force before the fertilizer men knew anything of it. When I asked one of them if he had complied with the law, he said they knew nothing about the law. I have said, "there is a law; you had better send to the Secretary of State; he will keep you fully posted."

J. C. Evans—It has been said that the Board of Curators over there at Columbia were not unfriendly to this Society. We have sent them lines of experiments we wished carried out, which they never carried out. For the last two or three years we sent none. Our demands have been ignored. We have not been invited to meet with them. Why should we not feel that they are unfriendly to us? If a change has come over them, I am very glad to hear it.

Dr. Porter—I will just say here the best move you can take to impress yourselves upon the Board of Curators, to bring yourselves into closer touch with the University. I have an urgent invitation for you to make Columbia your summer home. Hold your winter meetings at various places as now, but once a year come to Columbia and see for yourselves what is being done. I will warrant you that any suggestions you may make will go before the Board of Curators.

J. C. Evans—I want it distinctly understood that it is the Board of Curators that I criticise. I have made the assertion that that Board is unfriendly to this Society. I have too many evidences to bear me out in this opinion. About a year ago I was instructed to write a letter to the Board of Curators; that letter was written. There was nothing to justify them in ignoring that letter. That letter was written only a year ago. It struck them in session; that I know of. They gave no reply, and when they were in session again they still neglected or refused to answer that letter. They have not yet answered our letter. The only way I know of is to publish that letter to show that we have made an effort to work with them.

I insist that that Board of Curators are not friendly to the Society.

Sam. Miller—They seem to offer the pipe of peace now.

J. C. Evans—Did not they do it before? Last year one of them came to the meeting and made one of the nicest speeches we ever heard.

Dr. Porter—They told me to invite you to make Columbia your home. Rooms, museums, libraries etc. are at your service. I also hold in my pocket a letter from the town council, inviting you to go there. I want to say that you can thus become acquainted with our work. I would rather have one personal interview than a bushel basket of letters. I don't want to be held responsible for the shortcomings of my predecessors; it is as much as I can do to sweep my own door-yard.

A. Nelson—Will you try salt as a fertilizer for farm crops—try eight bushels, four bushels and two bushels per acre?

Dr. Porter—I will add this to the many experiments we have on fertilizers.

FRIDAY, December 8, 7:30 p. m.

GROWING AND TRAINING A PEACH ORCHARD.

BY S. W. GILBERT.

If a person wishes to grow a profitable peach orchard, the first thing to do is to find a soil and climate suitable for the production of this delicious fruit.

After repeated tests, the southern slopes of the Ozarks, and especially Oregon county, are found to be all that can be desired both in soil and climate, for the production of the largest and best peaches produced in the United States.

Having our location, we proceed to prepare the ground for the trees. Here in this country we find all lands covered with timber ranging in size from brush to trees three feet in diameter. Cut the trees and fall in winrows so that they can be easily burned, and do this work in July and August if possible.

After ground is cleared, I use a coulter, breaking the ground both ways thoroughly, and then plow with a common turning plow just as near four feet deep as I can. Harrow well, mark off rows 16½ feet apart each way, setting trees in cross. I usually make every 10th row 20 feet, in order to give plenty of room for gathering up fruit when trees are old.

Never set a peach-tree that is more than one year old. The tree should not be too large; about four feet high is large enough, and I have seen fine trees grown from a tree not over six inches high. A good, healthy root is the most important thing to look after, and not the top. Cut the tree back to two feet high, and let the branches come out within a few inches of the ground, and leave a stub an inch long when trimming the body back to a whip.

PROPER VARIETIES.

A most important item in successful peach culture is to select the proper varieties. How often have I seen orchards that had sadly disappointed the owner by the nurserymen not sending the trees that were ordered—perhaps not intentionally done on the part of the nurserymany, but when these errors are constantly coming to light, it is well to be on our guard, and, if possible, know beyond a question or doubt that we get varieties we order. I have been making my own trees since my first planting in 1889, and even now I find, occasionally, a seedling will slip in, and also a few other varieties in a block that I thought were all one kind. If it is so hard for the small grower to keep varieties straight, how very particular the nurserymen should be.

The following varieties were fruited on the "Flint Hill" this season, and have proved themselves all that can be asked of a peach: Gilmore, Linzey's White, Crawford's Late, Bequette, Crothers, Foster, Elberta, Gold Dust, Crimson Beauty, White Heath, Salway, Bonanza, Zella, and two or three seedlings.

The above list is as the trees were labeled when received. I find that the Linzey's White is a large free-stone, and some of my neighbors say that Linzey's White is a cling. If this is true, then I don't know what I have in this variety. The entire list is nice, large fruit with the exception of Gold Dust. This is a medium sized cling, but the finest canning peach I ever saw. When I wanted a delicious dish of peaches and cream, or a fine one to eat out of hand, I invariably took a Bequette. They are the juiciest freestone I ever saw, and of my very best shippers.

There are other valuable varieties that have been fruited in South Missouri that are very fine, and can be planted with profit. I cannot leave varieties without making special mention of a very large free-stone, name unknown, that is about as near perfection as you can get a peach. There were specimens that measured 12 inches. Flesh white, with a bright red blush over one-half of it, and a very fine flavor. I have called it Zella. I also had a very fine seedling, measuring 11 inches, yellow, free-stone, and a good peach in every way.

The Gilmore is a peach that I produced from buds taken from an unknown variety at Gilmore, Ark., a few years ago. It is the first of all to ripen, and its special merits are that it is a good shipper, I sent specimens to Chicago this season that held up for exhibition for two weeks after receipt there. This is something remarkable for an early peach. It is not fit to eat, but looks pretty and sells well in the markets.

CULTIVATING THE ORCHARD.

As a rule, we cultivate corn or potatoes in our peach orchards for the first three years, but if I had plenty of money to run the place, I should not grow anything but trees. The cultivation can be made more thorough when nothing is planted with your trees, and they will make much better growth. If corn or other crops are raised, they should by all means be discontinued after the third year. After the third year, either give constant and thorough cultivation from the time the trees are in bloom until no weeds will appear in the fall, or cultivate through the growing season up to about June 1st, or till very warm weather comes, then drill in stock peas, whip-poor-wills, and cultivate the peas until they cover the ground well, and then plow them under about the middle of September, and sow crimson clover to be plowed under the following spring. I am pursuing this course on a part of my orchard, and if the clover does as well here as farther south, I believe that the question of fertilizers is practically solved. I know that the peas are a splendid thing alone, and when taken with the crimson clover it is sure to make the ground very rich, and we cannot help but grow fine fruit. I have used some barn-yard manure, but believe that the peas are the best and cheapest.

PRUNING.

Training or pruning the peach is an important factor, and should not be neglected. When the tree is one year old, cut back all side-shoots and top-growth two-thirds; the second year, one-half to two-thirds, according to growth, and every year thereafter, fully one-half of previous year's growth. This is all the pruning that I have ever done in my orchard.

THINNING.

Thinning is also indispensable. It was a hard matter to get men that have the courage to go in and pick off three-fourths of all the peaches on the trees; their conscience would not allow them to do it. I sent them over the second time and gave positive instructions just how to do it, and after they were through I found that there would be branches too full. I took one of my men out and gave him a confidential lecture, and again gave positive instructions that he must not leave peaches closer than six inches apart on the tree, and that if I found a single branch after he had gone over it that was too thick I would take a club and run him off the farm. This time I think they were thinned properly.

SPRAYING.

Of course I have had a time spraying. You are all, no doubt, aware that I knocked an entire crop off in 1891 with Paris green. The trees did not recover sufficiently in 1892 to make a crop, and this season I thought I had the spraying business down pretty fine. I had read every work and bulletin on spraying that I could get hold of for two years. Sent to a half a dozen Experiment stations, and was thoroughly enlightened. I found that in 1891 the only mistake I had made was that I had omitted to add lime to my solution.

After so much reading I, of course, got my pump out this spring with all the confidence of a professional sprayer. I, however, felt a little weak in trying it, as this was World's Fair year and I did not want to lose my crop, for I had about the only one I could hear of in the State. I was very sure, however, that if I followed the formula recommended by the Department of Agriculture at Washington that I could not possibly make a mistake, so I took the dilute Bordeaux mixture and added four ounces of Paris green that I bought at Lockport two years previous, to 50 gallons of mixture. I sprayed four rows and weakened. I dumped the balance I had left out, and waited 10 days for results. A close examination at this time showed no signs of injury, so I braced up again and made another barrel of the mixture and sprayed eight rows more and again weakened. I dumped it out and waited another week. No signs of injury at all; I began spraying the balance, six rows, one-fourth mile long.

This morning the sun was out bright and warm for the first time since I made the first spraying, and everything was lovely; the air seemed to be filled with an invigorating something that makes one feel very happy.

When the six rows were completed I was about to commence the second spraying on the first four rows treated, but put it off for a day or two, Sunny weather followed, and about the third day after the six rows were sprayed, to my great horror I found the leaves curling up. Oh, how my heart sank! I could hardly support myself. I was struck dumb. All my hopes were blasted. No fruit for Chicago this year. Can you imagine my utter distress? A week later I found all foliage that had had a fair spray on the six rows all off the trees, and all peaches on those branches were wilting and dead. No fruit on the six rows except that part of the tree that did not get much of the mixture. Did not get more than one-fifth of a crop off those rows. A considerable foliage, perhaps one-half, dropped off of the eight rows that were sprayed a week sooner than these. Some of the fruit injured. On the first four rows I had a pretty good crop, and most of the trees had plenty of fruit left. I do not think from my experience it is wise to use more than one ounce of Paris green to 48 or 50 gallons of the dilute Bordeaux mixture. I am not through spraying yet, and shall try it again next season, if I have anything to spray, and hope to have better success.

PICKING.

Picking should be done at the right time, and a great deal of care taken so that the fruit may be started to destination without a particle of bruising. I use half-bushel picking baskets, and haul to packing shed in a light spring wagon. Here the packers assort carefully as to size, and sound, perfect fruit. No wormy or deformed specimens are packed for shipment at all, but sold on the home market for what they will bring.

To assist the packers, I have made a grader, by taking a piece of board three feet long and boring three holes in it. Diameters of holes, 1¾, 2 and 2½ inches, respectively. Any peach that is not less than 2½ inches in diameter, is what I term fancy, and is carefully wrapped in pink sissue paper. Those that are 2 to 2½ inches are wrapped in manilla paper, and are called mediums. This season I have packed the fancy and mediums in 6-basket crates, using enough excelsior between top layer of peaches and the middle or cover of crate to fill all space so that the peaches cannot be rolled about, no matter how roughly they are handled. In this way I have handicaped the express messengers. I have shipped them packed in this manner to Minnesota, New Mexico, Ohio, Illinois, Kansas, Colorado and other distant states without loss to the consignee.

The peaches that are one and three-fourths to two inches in diameter are packed in one-third bushel boxes and are sold for what they will bring. I believe the ideal peach package would be one that would hold nine baskets instead of six. Then they would be so heavy that messengers could not possibly throw them around, and would be compelled to carry them and set them down. The only objection to this size package that I can see would be that it holds more fruit than some dealers would want to buy at one time.

MARKETING.

Marketing is the business end of our labors. Some people can grow as nice fruit as you would like to see, but after they get it, seem to have no tact for disposing of it to good advantage. I have found it impossible so far to grow one-half enough fruit to supply my customers. One thing must always be borne in mind, and that is to never deceive a customer. Treat him so nicely that after he buys from you once he is your customer always whenever you have anything to sell that he wants.

Select the territory that you want to work, and work it for all that it is worth. If you see that you will not have enough fruit to supply all your customers, wire them at your own expense that their order will be filled, short, so many crates. Give him an opportunity to protect his trade from some other point. This is worth a good deal to him.

I have heard indirectly that I will get two medals for peaches and apples at Chicago this year, and am very proud of it, but I want to say that I owe all my success to our very worthy President and Secretary and the State Horticultural Society in general. I do not believe a man can grow fruit successfully in the State of Missouri, or any other State, without attending the State meetings and taking an active part in their work. I think we have a noble society and a grand set of officers, and no one appreciates it more than I.

No. baskets shipped	84
Crates fancy shipped	201½
Crates medium shipped	413½
No. of boxes shipped	294
Total No. of packages	993
Total cost of packages	$112 90
No. bushels shipped	593
Net returns per bushel after paying for packages and expenses	1 60
No. crates given away	6
Cost of wrappers	15 00

A good packer can wrap three crates an hour fancy.

A good packer can wrap five crates an hour medium.

Cost of labor for wrapping	$8 25

First ripe peaches June 11.

Sent to World's fair 6 baskets, 4 boxes, 64 crates.

Total sales peaches shipped	$1,092 62
Total sales peaches Thayer sales	280 70
Total sales	1,373 32

PEACHES AND PEACH-GROWING.

BY JAMES LAVALLE.

How to plant and how to grow an orchard is a question that concerns the owner of every farm who is desirous of making his farm useful and profitable. First, we must select the site, but as all sites do not slope to the desired points, nor everyone's land lay so as to afford the choicest selections, it becomes a matter of importance to be very careful in the selection of varieties of fruits adapted to the lay of the land as we have it, for there are varieties adapted to any exposure, whatever the lay of land may be.

In planting an orchard there is perhaps no better plan than to first visit all the orchards in the neighborhood, and then select such varieties as have done well on land similar to your own. The location of your orchard having been determined, a thorough preparation of the land becomes a first and prime necessity. Too often the orchard is planted on unprepared land, and trees are selected that are five or six years old for the purpose and in the hope of getting fruit the first year. This is a great and serious mistake. Never plant trees more than one or two years old, and see that the land is as well prepared for them as for corn or potatoes, and as much better as possible; then will your trees do you the best service and bear as early and much more profitably for the care and judgment bestowed.

The land should not be too rich or the trees will make useless wood, but should be of the kind that will produce 40 to 60 bushels of corn to the acre. But if the land is too poor to do this, then give plenty of good, well-rotted barn-yard manure, well worked in by plowing and harrowing.

In laying out an orchard, experience teaches us that there are certain distances to be observed both between the rows and between the trees. When you have determined upon these, take a good, steady team and plow the furrows out on each side, then take a shovel and dig out the hole until it is about two feet deep. Old chips or bones and wood of all kinds are good to plant on if they are filled in the hole in the fall or winter so as to have the surface solid enough to plant on in the spring. Trees planted in the spring should be mulched with straw or old grass until they are firmly set, then cultivate like corn or potatoes, being very careful not to plow too deep, not over three inches, and not after the first of July, as it keeps the trees growing too late, making wood to stand the cold winters of Central Missouri, when it sometimes goes down to 16 or 20° below zero, which is too cold for peaches.

We grow all our own trees from pits obtained from Tennessee. as they are said to be much better and less liable to be troubled with the flat-headed borer and hardier than trees grown in near-by counties, In budding trees it is found best in this locality to do it when about the size of a large lead pencil, as the bark works better then than when larger. Trees should always be planted when one year from the bud, for if left longer than one or two years the roots get long and hard, and make very bad trees to plant.

Pruning should always be done in the spring, about first of March. It is best to head back at that time, as it can be seen what to do and where to cut out the dead twigs. Nothing is more injurious to fruit than to have the trees full of dead brush. Very nearly one-half of the rot in orchards is caused by too much foliage and dead wood, and great pains should be taken in pruning, as it is the making of the tree when it is old. In my opinion, washing and spraying do not pay in St. Louis county when we can only count upon three crops in five years.

The following is a list of peaches in the order of their ripening, all thoroughly tested and found adapted to the soils of St. Louis county: 1, Amsden's June and Alexander; 2, Early Rivers; 3, Hale's Early; 4, Cottage; 5, Large Early York; 6, Foster; 7, Crawford's Early; 8, Susquehanna; 9, Ward's Late; 10, Crawford's Late; 11, Morris' White; 12, Stump the World; 13, Newington Cling; 14, Imperial Cling; 15, September Queen; 16, La Grange; 17, Heath Cling; 18, Silver Medal; 19, Nanticoke; 20, Freeman's Late; 21, Geary's Hold On; 22, Bilyon's Late October.

WHAT FLORISTS CAN DO FOR ADORNMENT.

BY EUGENE H. MICHEL, ST. LOUIS.

Ask three-fourths of the florists and landscape gardeners what they would do for the adornment of a certain place, and they would undoubtedly answer directly or questioningly: "That depends on how much money will be paid for the work."

Like a woman's dress, it can be made of any one of a thousand articles, or in any of a thousand and one different ways. Some would cost but a trifling amount, others hundreds of dollars, and yet truth must have it that in most instances the inexpensive garment would appear the neatest and by far the most useful ornament.

Thus, in many cases, the florist's accomplishments depend upon the amount of money to be spent by the parties having the work done. But, as in the case of the dresses, it is not always the most expensive that does the best service. Nor would I have you misunderstand me and believe that I would always have the man do the work who did the cheapest, for there are hundreds of incompetent persons doing work for little or nothing, yet calling themselves gardeners or florists, and as many more just as incompetent, passing under the same misnomer, but charging exorbitant prices. Many of the latter class blend with the familiar itinerant tree peddler, that curse of the nursery business who cannot remain long enough in any one locality to reap a just and proper reward from his scoundrelly labors.

So much somewhat irrelevant to my subject. Now what can we do for adornment? In answer I might point to every park in cities, large and small, to every avenue lined with trees, to every home with a flower garden, to every private conservatory, to every small or large specimen of flowering or foliage plant grown in the homes of our people, rich and poor. Then I would lead you to the decoration of a banquet hall, a theater, a home or a church, flowers cheering surroundings for festive occasions; and everywhere I would say: "This is what the florists do for adornment."

In the parks, collections of beautiful trees and shrubs, dotted about in bright green lawns, form an appropriate background for beds of bright flowers. No spots are more frequently or properly shown to visitors in any city than the parks, and it is the beauty of these that often leave the most lasting and favorable impressions.

You may have thought that my mention of avenues lined with trees was a little out of place. But I feel that the work of the florists and landscape gardeners are inseparable when one speaks of exterior ornamentation. The planting of trees is one item too often neglected in cities. Any one who has seen the beautiful avenues of the capital city of our Union, cannot but be favorably impressed of the vast importance and chaeerful influence of this work.

By the examples set by the trees and flowers of our parks, and by shaded avenues and the beauties of the florists' gardens and green-houses, and through the inborn love for nature's beauties, the people buy and cultivate flowers—thus carrying their bright colors and delightful perfumes to some degree to almost every home in our land. The florist is vain enough to claim the credit for this work, as he has set the example. He has introduced the flowers into popularity, and has shown their utility.

Looking at indoor decorations for dinners, weddings or balls, what a variety of things a florist may do for the adornment of the rooms. Beautiful table ornaments, adding freshness, delicacy, spiciness and delight to the festive board; bright emblematic floral arrangements, symbols of love, peace and happiness, lending grandeur and cheerfulness to the wedding celebration; graceful screens and festoons of greens and flowers adding to the appropriateness of dancing halls.

So far I have spoken particularly of the professional or commercial florist, the one who depends upon his work among flowers for his bread and butter. Now, don't you know that each and every one of you must be to a greater or less degree something of a florist yourself? You love flowers, of course, and if you don't, I know that your wife does, and that means you will have to, whether you want to or not.

You like to have your garden or your farm or your front lawn looking as bright, cheerful and home-like as possible. Being, as I have just stated, something of a florist yourself, you ought to know that flowers and weeds do not agree when put into the same place together. Not that they have not the same tastes, for that is rather the trouble. The most vulgar will always crowd out the more delicate and beautiful.

So see to it that the weeds are kept down. Work the soil good and deep. Enrich with well-rotted stable manure wherever you wish to plant flowers or shrubs. Get a good stand of blue-grass over the whole space that you wish to devote to lawns. Consult your wife about the amount you must reserve for her next gown and bonnet, and spend as much as you please for the ornamentation of your grounds.

Don't fill them too full; keep good open spaces, always bearing in mind when planting shrubbery the plants must grow and live in the same place for many, many years, the longer the better, and that as long as they live they ought to increase in size and beauty.

When you buy a Snow-ball, Lilac, Hydrangea, Althea or Cydonia from a florist and the plant is only two or three feet high, do not make the mistake made by too many hasty and incompetent professional as well as amateur florists, who place the plants within three or four feet of each other on spaces where each is expected to become an individual specimen. When planting such shrubs, try to bear in mind that these beautiful ornaments will grow to a height of 10 or 12 feet and their tops be fully as wide as the plant is high. If planted too closely together they become long, slender, weakly; too many trying to get sustenance from the same poorly refreshed soil, the result being quite unsatisfactory; no flowers appearing to brighten the plant, and everything assuming a neglected, uncouth appearance.

Driving through a newly dedicated park in a city not far from here, a few days ago, I found, time after time, clump after clump of really beautiful young shrubs that had been planted two years before. Every clump was made of 10 shrubs, and covered a space of not over 150 square feet, scarcely enough space for one good-sized shrub, as each of the 10 should make in five or six years. Imagine planting ten cabbages where only one can mature, or placing ten fruit-trees where only one ought to be, or more yet, compelling ten beeves to feed from a pasture sufficient for one. You have the same example in each case, the only difference being in the length of time required to show the effect of the error.

Aside from the shrubs and trees you must, of course, plant some flowers. Last year I wrote a very short paper on what you should plant in your flower gardens; some one said it was too short, but as it would require the best half of an hour to read it, I will be merciful. May it suffice that I say that my experience in this line is not worth one-tenth of your own to you, if you have been at all successful. If you have had nothing but failures, I might help you to beautify your flower garden, or to make one, but if you have succeeded in brightening your surroundings so that your neighbors would always admire your place, the only valuable advice I feel able to give is to follow the mandate of that excellent teacher "experience," and keep right on in the future as in the past.

OUR BEST BEDDING PLANTS.

Mr. President and Members of Greene County Horticultural Society:

At every returning spring or planting season the question is asked many times, what are our best bedding plants? As now there are an endless number of kinds, and the planter can hardly fail to made a good selection, it is rather a difficult task to say what is the best.

In my boyhood days it was easier to make a selection, for the number of kinds was quite limited; but now floriculture has made such rapid strides and improvements, especially in the last few years, that every taste and whim of the planter can have his or her fancy in the arrangements and harmonious blending of shapes and colors. Of late years the taste and love for bedding plants have kept up with the supply, and every season the wide-awake florist brings out some new or old candidate for bedding purposes. To give a list of what is best would be quite an undertaking, for the multitudes of florists' catalogues sent broadcast over the land every spring tells of all sorts of wonderful, rare and beautiful plants adapted to bedding out; but sometimes the novice gets misled by the gorgeous and fanciful coloring and descriptions of the new and wonderful things. Quite often one finds disappointment in purchasing these grand novelties.

Now I will try and enumerate a few of such as are among our best bedding plants. First and foremost stands on the list the queen of all flowers, the rose. Few plants, if any, are more extensively grown than the rose, and when reasonable care is given, the plants respond with an abundance of flowers. The rose is so easily grown and so cheaply got, there should be no garden without at least a small collection of hardy Perpetuals, or some of the more free-flowering Teas, Noisettes and Bourbons. Next to the Rose the Geranium should be in every flower-bed; the various kinds are so numerous that everybody can be pleased. I well remember the time when there were only a few kinds, but now their name is legion—every imagionable shade of coloring, from the purest white to the deepest scarlet, single and double flowering. Who would have ever dreamed of such magnificent kinds as the free-blooming Asa Gray, Double Gen. Grant, or the lovely E. G. Hill, or the beautiful Souvenir de Mirande? What can be more pleasing than a mass of Double Gen. Grants in full bloom? The Geranium grows almost anywhere with the least of care, and pays the grower in proportion to the work bestowed on them with a good supply of blooms. The Verbena, as a splendid bedder, is not to be overlooked. What a mass of bloom a small bed will produce is wonderful, and the variation of shades is almost endless; they are very easy grown and very cheap, but beautiful, and can be planted on beds previously occupied with bulbs, such as Tulips and Hyacinths. The Pansy, as a bedder for rather shady places, pays for all the trouble and expense. A bed of them will please without fail. The Lantanas of the various kinds will well repay; and no flower-garden is complete without the sweetest of all flowering plants, the lovely Heliotrope; by all means plant a few; and who can but admire the Salvia, with its brilliant scarlet spikes of flowers borne well above the foliage.

The Phlox Drumondi is another good bedder grown from seed. The Culphea or Cigar plant is also admired by many. The Petunias, single or double, rank as good bedding plants and are very effective in masses; their brilliant flowers of endless shading are certainly and justly prized; they are easily grown from seed. I would also mention the Tube-rose and Gladiolus as good and deserving; the Feverfew, an old plant, but their pure white daisy-like flowers are always liked; the Mignonette, Sweet Alyssum and the Ageratums, blue and white. The double Balsam is also greatly admired, especially White Perfection; although a common plant, when well grown is hard to surpass by the best of carnation except in fragrance. One of our most valuable bedders is the Coleus of the different kinds; there can hardly be anything in the floral kingdom that out-rivals their beauty; it is of comparative late introduction as a bedder; they stand the sunniest place in the garden; are easy grown and cheap. The Cannas of the various kinds are very effective in some gardens; their large and handsome foliage gives the garden a semi-tropical appearance; they flower very freely and the plants are cheap; of the easiest growth; can be kept over winter in a cellar free from frost, and multiply very rapidly; of late immense improvements have been made, especially in the dwarf ever-blooming French kinds. What is more beautiful than Madame Crazy or Star of '91.

Alternantheras of the different kinds for bordering or massing are par excellence. For lettering on the lawn or carpet-bedding they cannot be surpassed by any other plant in cultivation. A few years ago one of the grandest sights ever beheld in that line of gardening was seen by the writer at Shaw's Botanical Garden at St. Louis. One could hardly realize that nature and art were capable of producing such wonderful effects with such a plant as the Alternanthera; they are simply indispensable for that purpose.

Last fall, while on a visit to Ohio, beheld some exquisite work in bedding with Alternantheras at Cedar Hill cemetery, Newark, Ohio, also some very elaborate designs at Baltimore & Ohio railroad depot at Newark, O.; they were beautiful beyond description; also a good deal of nice bedding of various kinds of plants at all stations along the line of the B. & O. road. It was a surprise and pleasure to me, and, no doubt, to many of the travelers, to see such nice tidy little flower gardens kept by the so-called soulless corporations. Let the good work go on; would like to see other railroads do likewise. Last but not least of the bedders comes the queen of autumn, the lovely and beautiful Chrysanthemum; a goodly number of kinds are necessary in a well-regulated flower garden, for they give us such an abundance of fine bloom at a time after Jack Frost has destroyed nearly all the beauties of the garden that held sway in the warm days of summer. While the Crysanthemum is not strictly a bedding plant, for they come so late in the season, but recently the improvements made give us some very fine kinds that come into bloom in September, and thus it makes this flower more desirable for bedding. To get the best results from the 'Mums they should be planted in a well-sheltered place, facing south if to flower outside; but the best plan is to take up and pot about the middle of September to bloom in the house.

As another fine plant for bedding, would mention the Astor, easily grown from seed, and when massed give a grand effect. Our worthy President had a magnificent display last season, and he was justly proud of his success. I am afraid this list is growing as long as a florist's catalogue. While a number of really deserving things could be mentioned, the foregoing gives a good selection of bedding plants that are beautiful, free-blooming, and easily grown by almost any one.

Jos. Kirchgraber.

Springfield, Mo., April 1, 1893.

S. W. Gilbert—I have a bed of roses 12 or 14 feet in diameter; in the center of this bed I sunk a kerosene barrel which fills with water in a wet time to supply the plants in time of drouth.

A HORTICULTURAL LIBRARY.

L. A. GOODMAN.

A library of this kind seems to be a necessity to anyone in this line of work, just as much as a law library is to the lawyer. I mean by a library, not one of those where every book must be read through from cover to cover, but one which is not only to be read and studied, but which may be used for reference also.

This library, or at least some of the leaves from it, should be in every library in the land, and we would then not have so much nonsense about the growth of plants and trees, as well as the kinds of trees that grow in our forests, line our streets or dot our hillsides. A horticultural library should be in every public library in the land, and some knowledge of flowers, fruits, vegetables and trees instilled into the minds of our young people. A very close and select library should be in every school-house in the land—one of at least three books: one on botany, one on bugs, and one on fruits and flowers.

But the best horticultural library in the land is found in the woods, in the orchards, in the gardens, in the nurseries, in the parks, in the green-houses, in nature; in fact, we want enough of this library studied, so that more of our people can tell a peach from a cherry tree, a plum from an apple tree, and a pear from a chestnut.

Of all the ignorance in the country, none is so bad as that of our city chaps when they come to the country and ask if turnips grow on vines, or pumpkins on trees; and the young lady needed this kind of a country horticultural library who said "that it seemed nice to gather summer apples in the summer, but she pitied the farmers who had to go out in the winter to gather winter apples." She needed a horticultural library and some country knowledge; in fact, a touch of nature.

But I deem it, that we want discussion of the books most needed by the true horticulturist to help develop him in his line of work. Whenever a man stops his study or his investigation because he knows "just as much, and more too, than the books can tell him," then it is time to question himself as to his knowledge. I never was so struck with this idea of book learning, and the disrepute in which men are held by too many of our people, as I was at one of the Farmers' Institutes held in this State. I overhead a bunch of farmers discussing the meeting very excitedly, and one made the remark "that he had no use for the speakers at the institute, for they were all book farmers, and had never planted a tree in their lives or used a spade or plow." It struck me rather forcibly, for I had been one of the speakers that morning, and to be classed simply as a man without any experience seemed ludicrous to me, and rather humiliating besides, to one who had done every one of these things with his own hands.

This is where the library of nature and growing trees and plants are our best teachers, but none the less do we need the experience of others who have spent a life-time in the study. The experience of B. T. Galloway with fungus growth, the knowledge of Miss M. E. Murtfeldt in entomology, the results of experiments of such men as Samuel Miller, H. Jaeger, M. G. Kern, John Burr, T. V. Munson, and hundreds of others, is too valuable to be lost, and must be written in books so that we can read them.

The first book I would call your attention to is Gray's "Botany." Of all the pleasant studies I think this is the most fascinating. A true science; it is so nicely worked out; when you take a flower and begin by noting its parts and tearing it to pieces, there to read its origin, its history, its family, its name even; and how delighted to find the result so easily, so well and so surely. It is with the utmost satisfaction that we take a flower, like taking an unknown path, and after going to every part of it, find it leads to such a sure home or name.

The second book is Dana's "Geology," for the fruit-grower should know about the soils as well as the fruits.

The third is Downing's "Fruits and Fruit-Trees of America," the most complete work on fruits in the country. We must also have Thomas' "Fruit Culturist," for it gives us some things not found in others, and it is a handy reference book also.

For a person who wants to understand more of the growth of plants and the feeding of plants, the uses of the roots, the branches, the leaves, the fruit, the seeds, in fact the science of growth, he should get Johnson's "How Crops Grow" and "How Crops Feed," two very valuable books indeed to anyone who loves the study of nature.

Our next books must be on the small fruits. Fuller's "Small Fruit Culturist," "Farmer on the Strawberry," Husman's "American Grape-Growing," are among the best published. Quinn's "Pear Culture for Profit," Meachi's "Quince Culture," Fulton's "Peach Culture," Henderson's "Gardening for Profit," Quinn's "Money in the Garden," Henderson's "Practical Floriculture," Roe's "Play and Profit in my Garden," Vick's "Flower and Vegetable Garden," will cover about all that is absolutely needed in the fruit, flower and vegetable garden. Perhaps two of these latter will be enough for the majority of people, but if you like study, take them and read them, and practice what you read. You will find, as you well know, for all it looks so simple and easy on paper, that it does not work out so easily, and many a person has been badly disappointed in the results.

Besides these, we must have a few books on other topics, also—Fuller's "Practical Forestry," "Plant Life on the Farm," Thomas' "Farm Implements and Machinery." Above everything, we must not forget 'Our Friends and Our Foes," "Birds and Bugs, and Bugs and Birds." We are having such a supply of these valuable books that there is no reason for not knowing some of these at sight.

"The Outlines of Entomology," by Miss M. E. Murtfelt, should be in the hands of every fruit-grower. Its lessons are so simple and so well written. and so easily understood and so valuable, that you must read this. "Insects Injurious to Fruit" is one of the best published in the country, and will open up a field to you that was unknown.

Treat's "Injurious Insects of Farm and Garden," another good one in the same line."

"The Farmer's Friend and Foe" will give you a great many good hints also, and you will know your friends and foes better after having read it.

Well, we must do something about beautifying our place, and know how to plant judiciously and correctly; then we want one book at least on the subject of landscape gardening—"Ornamental Gardening for Americans."

A few miscellaneous books and the list is complete for most persons—not that it is complete for a reference library, but probably as complete as most people will like to make it on account of the expense: "Household Conveniences," Wright's "Practical Poultry-Keeper," King's "Bee-Keeper's Text-Book," Henderson's "Hand-Book of Plants," "Every Woman Her Own Flower Gardener," "The Nursery Book."

But after all this, we must not lose sight of the fact that the horticultural library must fail of its best good if we leave out the grand array of horticultural papers of our country.

The wonderful development of horticulture in our country is due to the efficient work of the press. It gives us each week or each month a most valuable collection of experience, theories and practice, which we cannot afford to do without. We should, therefore, have at least four or five good papers or magazines in order to keep up with the work as it is going on about us.

The books of late publication, and most valuable to the fruit-grower, are: "Annals of Horticulture," Vol. 4, "New Potato Culture," "Horticulturist Rule Book," "Cross-Breeding and Hybridizing," "The Modification of Plants by Climate."

The cost of such a library to the fruit-grower is a serious obstacle. But I do not know how you can better spend money than to get some facts into your head about your business; in fact, you cannot afford to go without some just such horticultural books; get them one by one and go without something else; you will find it the best money you ever invested. The list down to the miscellaneous books will cost $25 to $30, and I am sure that you will always enjoy such a library. A larger and more extended list might have been given, but in all probability this list is rather too long than too short; a few of the least important could be left off and bring the cost down to about $20, and there it should stop if you want the books that you need.

THE PROGRESS OF HORTICULTURE.

S. MILLER, BLUFFTON.

There are here some who, like myself, can well remember the time when the growing of fruit and the pursuit of horticulture received but a tithe of the attention that is given the subject in our day.

Then the ordinary farmer planted an apple orchard for his own use—as a rule, perhaps some seedling peach-trees, and if in advance of his neighbors a few pear, plum and cherry-trees. If any grapes, they were the wild Fox grape of our forests, or the old Alexander variety.

Foreign fruits in their fresh state were seldom met with. Strawberries only such as could be found in the fence-corners of the fields and meadows. Raspberries, I know of only one variety cultivated in gardens—the old Purple Cane—a good red one, but long since displaced by superior ones.

To cultivate a blackberry was an unknown thing. Currants were more common, and I saw and helped gather such crops of Red Dutch currants 60 years ago that nothing since then has surpassed them in my observation. They were grown on the north side of a picket fence.

It is needless to follow up the progress in our line, but we will pass over our time of three-score years, and look at the condition of these affairs in 1893.

Now, instead of a few wild strawberries no larger than a small thimble, we know of stations on our railroads where train loads are drawn out from, and the cities a thousand miles north are supplied with them at a time that the ground there is frozen and covered with snow. Varieties without number, some as large as any one would desire them, and of excellent quality.

Raspberries follow, and next the blackberries—the latter two not so extensively as the strawberry.

Peaches and pears are planted by the hundreds and thousands of acres, and have been so arranged in ripening that the former can be had fresh for six months, and pears nearly the whole year.

Of apples the commercial orchards are legion, and some of them so large that it would tire a well man to walk around them.

Grapes are in variety, nearly up to some of the other fruits, and can be had fresh for a number of months. Such is the range of latitude, diversity of soil and situation, that a signal failure is almost impossible, and when failing in one section of the country, there will be an abundance in others.

Just at this time we have an example of it, as nearly all our fruits have been a failure, yet one can buy fresh grapes in every little town at a price that will hardly pay for the raising of them.

This happens simply because the growers in New York and Ohio plant too extensively for their own good in a financial way.

But it is a blessing to others that the planting of apple orchards is being overdone, as many fear we will find out in the future.

Evaporating for exportation will be one way, and every person to have plenty of good, sweet cider in their cellars to drink will be another outlet. It may lessen the drinking of beer and other beverages that do more harm than good.

The time is coming when our population will need the rich farming lands to raise grain and meat, while the hills and rocky ridges will be set with vines and fruit-trees. In Missouri are millions of acres that may seem almost valueless that will, in time, be covered with choice fruit-trees.

An example of this is the Olden fruit farm in Howell county. It shows what skill, energy and a true knowledge of horticulture can accomplish.

Go to any fruit-stand in a large city, and you can get oranges and lemons from the south of Europe all along the Mediterranean sea, from Florida, Louisiana and California; also bananas as plenty almost as potatoes, and cheap enough to be purchased by the poor.

Who will say that we are not progressing in our line equal to any of the arts and sciences, or any of the professions?

The railroads netting over the country so as to enable sending our fruits to where they are needed.

Two great features in this line is that plenty of fruit has a tendency to lessen the taste for strong drink, and conducive to health.

It is an established fact that the life of the human race is prolonged within the last half century, and this is one of its causes, that our people consumed more fruit than formerly.

Now then, for those engaged in this noble calling I hope they will press on and keep the progress gaining as it has in the past decade. Science has come to our aid, and now we know how to circumvent the Codling Moth, the Curculio and the grape-rot, scab and rust; and if the calomel cure will stop the pear blight, we are on the high road to success.

For me there cannot be much more time, but while here, and able to handle the knife, pruning shears, spade and hoe, I expect to keep in the harness to the end.

SAMUEL MILLER.

REPORT OF COMMITTEE ON

HORTICULTURAL EDUCATION.

To the Members of the Missouri State Horticultural Society at Fulton—Greeting:

Your Committee on Horticultural Education, appointed at your meeting at Columbia, beg leave to submit the following report:

From the plan first inaugurated by the Pettis County Horticultural Society, and from the many practical suggestions gathered at the summer meeting of the State Society at Columbia, your Committee have been able to map out a plan which seems to meet the hearty approval of all the fruit-growers of our State. The plan, as now approved of, is to have the members, and other friends of horticulture as well, ask and answer, annually, in a brief and pointed way, 100 questions on horticulture and floriculture. These questions and answers (or so many of them as the committee see fit) are to be published in the annual reports of this Society. When we have gotten into shape a practical and somewhat exhaustive course of study, simple, yet valuable, on account of the experience of the many who contribute to the fund of facts, then we will have the whole printed and bound in a volume by itself, and it shall be known as "The Hand-Book of Horticultural Knowledge for Missouri."

It is fast becoming a popular idea that horticulture should be taught in the country schools.

If this idea becomes universal, then the Legislature will take action to adopt a text-book. There could be no text-book that would take the precedence of this one, because of, 1. *Its aim*, which is to give the best idea of fruit and floriculture, as found by experience to be adapted to this State; 2, *Its substance*, which will be the specific knowledge of the students of every special line of horticulture throughout Missouri.

Your Committee has made no effort at classification, as that can be done when the final publication is made. Our members have responded heartily already to our call for questions and answers, and we believe before the subject-matter of the State report is ready for the press, all the questions will be ably answered.

Your Committee urges each member to cultivate the art of answering these questions in writing, believing that the practice will more than reward you liberally for your time and trouble by getting you in the habit of putting your thoughts on paper in a pointed and practical manner; besides, it will help us all to store our minds with such knowledge as will make us intelligent in our business.

Let us now do our part bravely to help our children, and those not having had our costly experience, to arrive at fair conclusions concerning this important and delightful occupation.

The committee wishes to acknowledge its obligations to Prof. Wm. Trelease, Miss M. E. Murtfeldt, Mr. E. H. Michel, and in fact to a number of our best fruit-growers about the State.

G. B. Lamm, Chairman.
L. A. Goodman,
George L. Purinton,
Mrs. G. E. Dugan,
Van B. Wisker,
Committee.

A LIST OF QUESTIONS AND ANSWERS BY MEMBERS OF THE SOCIETY.

Question 1. Mention those fruits most successfully grown in Missouri.

Apples, pears, peaches, in South Missouri; plums (native), grapes, cherries (Duke and Morello varieties), strawberries, raspberries, blackberries, gooseberries.

2. Mention those less successfully grown.

Peaches in North Missouri; plums (foreign), apricots, nectarines, quinces, currants, mulberries, cherries (Heart and Bigarreau varieties).

3. Name, if any, the native fruits of Missouri.

Pawpaw, persimmon, haw, crab-apple, grapes, elderberries, strawberries, raspberries, blackberries, gooseberries.

4. Name the natural or wild fruits of Missouri that are profitable.

Strawberries, raspberries, blackberries, grapes and gooseberries.

5. Name the nuts grown successfully in Missouri.

Hickory, walnut, pecan, hazel.

6. Name the foreign fruits that find a market in Missouri.

Bananas, pine-apples, oranges, lemons, citron, grapes, prunes, dates and figs.

7. What fruits can we ship successfully to foreign countries?

Apples, oranges, lemons and grapes.

8. What fruits are shipped green and ripen after being shipped?

Bananas, oranges and lemons.

9. Name the common kinds of packages used in shipping fruits.

Boxes, baskets, crates and barrels.

10. Name the common kinds used in handling fruits at the orchard.

Quart boxes for berries, ½-bushel boxes and baskets, 1-bushel baskets and boxes, and barrels for apples.

11. What methods used in preserving and shipping fruits not in their natural state?

Evaporating, canning, drying, preserving and crystalizing.

12. What is the weight of a bushel of apples?

Forty-eight pounds.

13. What is the weight of a bushel of dried apples?

Twenty-four pounds.

14. What is a fruit?

That portion of a plant which consists of ripened carpels and the parts adhering to them; that part of the plant which contains the seed, covering and including the seed, such as apple, peach, pear, strawberry, raspberry, grape, etc.

15. What is meant by fruit-candies?

Fruits dipped into hot sugar syrup and then dried.

16. What is meant by evaporated fruit?

Fruit dried in hot-air receptacles which rapidly expel the moisture and bleach the fruit.

17. What purpose does fruit serve as food?

Assists the digestion, serves an appetizer, contains sustenance for the body.

18. What is a scion?

The last year's growth cut from a plant, intended to be grafted upon another plant, known as the stock

19. What is meant by a cutting?

The last year's growth cut from a plant, intended for propagation without grafting.

20. What is meant by a graft?

That union of the scion and the stock, thus forming a new plant of which the scion determines the variety.

21. Name the animals and birds which are enemies of fruits.

Rabbits, mice, gophers, moles, cedar-birds, blue jays.

22. Name the diseases and fungus growths which retard the growth of fruits.

Rust, mildew, blight, scab, rot, yellows, rosette, black-knot.

23. Name the hindrances to fruit-tree culture.

Injurious insects, fungus growth, atmospheric changes, adaptability of soil.

24. What, do you think, are some of the greatest hindrances in the horticulturist himself?

Want of knowledge, lack of adaptability and love for the work; carelessness.

25. What are fungi?

A fungus (plural, fungi) is a plant of simple organization, without either leaf or flowers, which is never colored green. The fungi are dependent on organic matter for their existence, and they obtain this either from dead plants or animals or from living plants or animals. The parasitic fungi, like the rusts, smuts and mildews of cultivated groups, and bacteria, which cause the blight of the pear and many of the contagious diseases of animals, are illustrations of the class which feed on living beings. The mushroom, and the moulds which occur on cheese and other food, illustrate the fungi which live upon dead organic matter.

26. What is leaf-blight?

A special fungus growth which attacks the leaf growth.

27. What is meant by twig-blight on fruit trees?

A special fungus which attacks the current year's growth and kills it.

28. What are the yellows and rosette on the peach-tree?

They are diseases of fungus growth which attack the fruit, leaves, and finally twigs of peach-trees, causes them to turn yellow and drop, and finally kill the trees.

29. What is the black-knot on the cherry and plum-tree?

It is a knot of fungus growth which comes on the branches of the trees, and finally spreads to other branches until it destroys the tree.

30. What is a fungicide?

A copper solution which is used to prevent the fungi from growing on trees and plants. The best fungicide is the Bordeaux mixture.

31. Name the birds useful to the fruit-grower.

All birds, except the English sparrow, the blue-jay and cedar bird.

32. Name the methods of encouraging these helpers to man in fruit-growing.

Encouraging them by giving them protection and furnishing them food.

33. Give best soil, exposure and distance for planting peach orchard?

The highest, driest soils of our State, and the high lands in South Missouri are the best; the best exposure is the north side of the hills. Distance 16½ feet by 16½ feet.

34. Give best soil, exposure and distance for planting apple orchard?

The timber soils and bluff lands are the best; any exposure will answer. Distance 25 feet to 30 feet by 25 feet to 30 feet.

35. Give best soil, exposure and distance for planting cherry orchard?

Highest and driest soil; south slope; 20 feet by 20 feet.

36. Give best soil, exposure and distance for planting plum orchard?

Cool moist soil, alluvial flat land; 15 feet by 15 feet for foreign, 20 feet by 20 feet for native.

37. Give best soil, exposure and distance for planting vineyard?

A high sandy loam; east slope; 8 feet by 8 feet.

38. Give best soil, exposure and distance for planting raspberries?

Same as 37, and 3 feet by 8 feet.

39 Give best soil, exposure and distance for planting blackberries?

Same as 37, and 4 feet by 8 feet.

40. Give best soil, exposure and distance for planting strawberries?

Same as 37, and 1½ feet by 4 feet.

41. Give best soil, exposure and distance for planting gooseberries?

Same as 36, and 6 feet by 8 feet.

42. Give best soil, exposure and distance for planting currants?

Same as 36, and 4 feet by 8 feet.

43. Give best soil, exposure and distance for planting quinces?

Same as 36, and 12 feet by 12 feet.

44. With what kind of tools do you cultivate trees?

Plow, harrow, disc-harrow, cultivator, hoe.

45. With what kind do you cultivate berries?

Same as above, only use hoe more.

46. Do you advise deep or shallow cultivation?

Shallow.

47. In what condition would you put the ground before applying fertilizers?

Sow or spread the fertilizers and plow them under.

48. What fertilizers are the best for the horticulturist?

Ashes, lime, salt, bone meal, dried blood.

49. When should the fertilizer be applied?

In the spring.

50. What crop can we grow in an orchard?

Corn, potatoes, melons, tomatoes or any hoed crops until the trees begin to bear, and then no more crops should be grown.

51. What stock should be allowed to run in an orchard?

Fowls, at all times. Hogs and sheep while fruit is ripening, only.

52. Why do fruits turn red or assume other bright colors when ripe?

The colors of fruits are usually connected with the dissemination of their seeds by animals, which in most cases feed on them. The colors appear when the fruits are becoming ripe, because at this time the seeds are ready for distribution. The colors are usually due to the development of pigments dissolved in the sap of the cells which lie near the surface of the fruit. Yellow fruits usually owe their color to a yellow pigment contained in parts of the protoplasm of the cells, corresponding to the chlorophyl grains that give the green color to foliage and to green fruits. The formation of these colors is usually attended by a mellowing of the tissue and the disappearance of acids which rendered the green fruit sour, and their replacement by sugars.

53. What is a nursery?

In horticulture, a plantation of young trees and shrubs, which are removed frequently, so that their roots do not spread over too large a space, and in this way are kept in condition for transplanting, whenever needed, to the orchard or other place where they are to grow.

54. What is the science which treats of insects?

Entomology, derived from two Greek words, which signify a discourse on insects. Economic entomology is a practical application of a knowledge of the forms and habits of insects to the more thorough extermination of injurious species and the protection of those that are either directly or indirectly beneficial.

55. What is an insect?

An insect is an animal with its skeleton on the outside divided into thirteen more or less distinct rings or joints, held together by elastic membrane, having in its perfect state the body divided into three regions—head, thorax and abdomen—and having always six jointed legs and usually two or four wings.

56. Why do insects infest plants?

Because the fruit affords them a congenial place where they may live, develop and propagate their species.

57. What insects are directly beneficial to the horticulturist and florist?

Bees, wasps and many sorts of flies Butterflies and moths are useful in conveying the pollen from the stamens of one flower to the pistils of another, thus securing perfect fertilization and desirable cross-fertilization.

58. What are some other beneficial insects?

Some of the ground beetles, which feed upon the larvæ of the curculio, and upon other grubs, as well as cut-worms, after they have entered the ground to change. Hundreds of species of large and small flies, also, are direct parasites, breeding in the bodies of and killing cut-worms and other caterpillars, borers, and all varieties of fruit worms. Other useful insects are the Mantes or devil's horses, the lace-wing and syrphus flies, and the lady-bird or lady-bug beetles, whose larvæ are the especial foes of plant-lice and devour countless numbers of them.

59. What is the most remarkable peculiarity in the development of an insect?

Their transformation or metamorphosis. The life of every insect includes four distinct stages—the embryo contained in the egg; the larva, in the shape of a caterpillar, grub, maggot or worm, or of wingless bugs, grasshoppers and certain water insects. It is in the larva state that all true growth takes place. The next stage is that of a pupa or chrysalis, which in the great majority of insects is a period of quiescence, in which there is very little motion or appearance of life. The last stage is that of the imago, or perfect insect, in which it acquires its true antennæ or horns, its six jointed legs and its two or four wings. In this stage only can the sexes be distinguished.

60. In their relation to man, how do we classify insects?

Into useful or injurious species.

61. Which are the most numerous?

Injurious insects.

62. In which stage of their existence do insects, as a rule, do the most damage to our crops?

In the larva or growing stage.

63. What are some of the larvæ most injurious to fruit and fruit-trees?

Grubs in the trunk and branches, such as the round-headed and flat-headed borers; caterpillars on the leaves, such as the canker-worm, web-worm and tent caterpillar; and so-called worms in the fruit, such as the larvæ of the codling moth and the plum curculio. The white grub also, which is the young of the May beetle, is a very destructive larva which feeds upon the roots of stawberries and other herbaceous plants.

64. What insects are very destructive in their perfect as well as in their larva state?

All grasshoppers and locusts, all true bugs and many beetles.

65. What groups of insects never do any direct harm in their perfect state?

Butterflies and moths.

66. How can we learn to associate the perfect form of the insect with its larva and pupa?

By rearing the larva in some place of confinement, like a box or jar, feeding it on the sort of leaves on which it was found, taking care that it is not disturbed or injured while in the pupa or resting stage, and by slightly moistening the leaves or earth in which it reposes, from time to time, until the winged moth, butterfly or beetle appears.

67. How may insects be best preserved for exhibition in the school-room?

Insects in their perfect state should be first killed by chloroform or gasoline, and while they are still soft, pinned through the thorax to a piece of cork or soft wood and carefully dried. Each specimen should be labeled with its common, and, if possible, with its scientific name, and also with the date and place of its capture, All larvæ can be preserved in small bottles or phials in alcohol reduced by one-fourth water and tightly corked, and must also be labeled.

68. What is an insecticide?

Any poison or other application that is known to kill an injurious insect, such as Paris green or London purple, which, mixed with a large proportion of flour or thoroughly stirred in water, are either dusted or sprayed upon leaves and fruit, and, being eaten by the insects, cause their death. Other insecticides, like pyrethrum powder, kerosene emulsion, and various soaps, kill insects, like tree-bugs, bark-lice, aphis, or plant-lice, by contact with the surface, which these applications either eat into or glaze over or upon which they produce paralysis.

69. What science treats of plants and plant-growth?

Botany.

70. What is meant by class, order, genus, species?

The botanical divisions or classifications of all plants by which they can be identified.

71. What are root, stem, leaves, flower, calyx, sepals, corolla, petals, stamens, anthers, pistil, ovary?

The root is that part of the plant which grows in the ground.

The stem is that part which grows from the root and from which the branches grow—the body.

The leaf is the expanded bud, the growth of the bud, the lungs of the plant.

The flower is the modified leaf which produces the fruit — the combined calyx, corolla, sepals, petals, stamens, pistil and ovary.

The calix is that portion of the flower which surrounds and holds the flower proper.

The sepals are parts of the calyx.

The corolla is the bloom itself, the colored portions of the flower.

The petals are parts of the corolla.

The stamen is the male organ of flowers.

The anther is that part of the stamen containing the pollen or fertilizing dust.

The pistil is that part which carries the pollen to the ovary.

The ovary is the seed-pod.

72. What is pollen?

The yellowish dust that comes from the anthers, which fertilizes the flower.

73. What is fertilization of flowers?

The pollen, falling upon the pistil of the flower, causing it to form seed.

74. What is meant by the sap of a tree?

The vital circulating fluid inside the tree, which causes the tree to live and grow.

75. What causes a knot on a tree?

A branch always causes a knot in the tree, and any obstruction of the flow of sap will usually cause a knot also.

76. What is a tree?

A plant with woody structure, body and branches, and generally more than 10 feet high.

77. What is meant by a bulb?

The large root or root-stalk, above or below ground, from which the growth takes place, like a bud; a bud or buds, like the onion or tulip.

78. What is a tuber?

A fleshy, rounded, solid stem or root, usually containing starchy matter, like the potato.

79. What is meant by seedling?

A plant grown from the seed.

80. What is meant by a cross?

A flower of one species fertilized by the flower of the same species produces a cross.

81. What is meant by a hybrid?

A flower of one species fertilized by a flower of the different species produces a hybrid.

82. What is a botanical garden?

Where plants, shrubs and trees are arranged botanically: that is, in groups or families, species and varieties, usually for the purpose of study.

83. What is a green-house?

A house which is covered with glass and so arranged as to control the temperature, in which plants are grown.

84. What is meant by a florist?

A man who makes it his business to grow flowers, plants and shrubs in green-houses.

85. What is the best location for a flower garden?

Southeast exposure, with protection on the north and west.

86. Name 12 hardy shrubs for out-doors.

Hydrangea, Althea, Syringia, Snow-ball, Forsythia, Lilac, Deutzia, Spirea, Purple Fringe, Weigelia, White Fringe, Pyrus Japonica.

87. Mention some hardy flowers for country homes.

Perennial Phlox, Iris, Peonies, Yucca, Grass Pinks, Crocus, Hyacinths, Tulips, Lilies, Hollyhocks.

88. Name 10 best hardy roses for out-door blooming.

Prairie Queen, Baltimore Bell, General Jacquiminot, Paul Neron, General Washington, Mad. Chas. Wood, Marshall P. Wilder, John Hopper, LaReine, Anna des Diesbach.

89. Name ten best roses of ever-blooming varieties.

La France, Hermosa, Appoline Washington Noisette, Duchess of Albany, Souvenir De Wooton, Agrippina The Bride, Clothilde Soupert, Pearle des Jardines, Duchess de Brabrant, Monthly Cabbage.

90. Name ten chrysanthemums.

Gloriosum, W. H. Lincoln, Kioto, Ivory, L. Canning, Puritan, V. Morel, Mermaid, V. H. Hallock, Ariadne.

91. What climate is noted for the most luxuriant growth of flowers?

Tropical and semi-tropical.

92. What is meant by a commercial orchard?

One grown purely for market purposes, usually of a large area.

93. What is the king of all fruits in the United States?

The Apple.

94. What takes place when fruit rots?

Decay and decomposition of the cells takes place, and fermentation spreads this decay to all parts of the fruit.

95. Why cannot fruit stand freezing?

Because it ruptures the cells of the fruit and decay takes place.

96. What takes place when fruit juice turns to vinegar?

Vinegar is formed when the fruit juices are developed or turned into a certain per cent of acetic, malic and tartaric acids.

97. What works on horticulture should the student horticulturist read?

Gray's Botany, Downing's Fruits and Fruit-Trees of America, Thomas' Fruit Culturist, Barry's Fruit-Growing, Fuller's Small Fruits, Henderson's Gardening, Henderson's Flower Garden, Packard's Insects, Miss Murtfeldt's Outlines of Entomology, Hussman on the Grape, Hoope's Book on Evergreens, Long's Landscape Garden, Ellwanger on the Flower Garden, Bailey's Horticultural Rule Book.

98. What about Missouri as a fruit State?

Missouri is peculiarly adapted to fruit-growing, because of the geological formation of the soil, the climate, and the close markets.

99. What position does Missouri occupy as a fruit State?

In value of her fruit products Missouri ranks fourth.

100. This work will accomplish its purpose when it guides the inquiring minds into channels of thought, and assist them in reaching practical results in the horticultural art.

The following exhibits were on the tables making a very very creditable display indeed, and one admired by all the visitors:

S. W. Gilbert, Thayer—72 plates (varieties) of apples.

L. A. Goodman, Westport—34 plates apples.

N. F. Murray, Oregon—64 plates apples.

Olden Fruit Co., Olden—47 plates apples.

J. C. Evans, Harlem—42 plates apples.

A. Nelson, Lebanon—16 plates apples.

J. H. Bailey, Messilla, New Mexico—Collection apples 36 plates.

D. S. Helvern, Mammoth Springs, Ark.—Collection apples 26 plates.

G. G. James, Exeter—6 plates apples.

J. H. Marion, Fulton—4 plates potatoes; 2 plates persimons.

B. F. Wilcox, St. Soseph, Mo.—Ben Davis, Yellow Bell-flower, Willow Twig, Jonathan, Wine-sap, Limber Twig.

L. L. Seiler, Lake Charles, La.—Rice in the sheaf, quinces, 3 varieties oranges, 2 varieties Japan persimmons, figs in branch, figs in glass, sugar-cane, grasses and several other articles.

A. Nelson, Lebanon—Collection of 23 varieties corn; collection potatoes, vegetables.

H. Schnell, Glasgow—Potatoes: Irish 2 varieties, sweet potatoes 7 varieties, 1 bunch celery.

J. O. McClintic, Hatton—10 varieties corn, 3 varieties potatoes.

REPORT OF COMMITTEE ON AGRICULTURAL PRODUCTS.

The exhibit of these products from Laclede county, made by A. Nelson, of Lebanon, contains 27 varieties of corn from field and garden; 15 varieties of vegetables—mostly potatoes.

The improved Corry corn and Nelson's Hybrid sweet corn deserve special mention. The Corry corn is the special favorite for family use, and the Hybrid is larger and longer in the ear, and the favorite of market gardeners and canning factories.

Of the field corn there are kinds here well adapted to bottom lands and others for high lands and short seasons. Any corn-grower can easily find corn here well adapted to every variety of soil, climate, altitude or season.

The potatoes and root specimens are all most excellent specimens of pure bred vegetables. This exhibit as a whole is a forceful object-lesson in the possibilities of the Ozark regionof South Missouri, and what can be done by intelligent cultivation.

We recommend that the sum of $10 be awarded this exhibit.

The exhibit of J. O. McClintic, of Callaway county, contains corn, potatoes and squash.

The corn is of the white and yellow varieties, and uniform in size and length of ear; there are late and early varieties.

The Early Walton potatoes should have special mention. We recommend that $2 be given for this exhibit.

The market garden exhibit of Henry Schnell covers a large variety of sweet potatoes, some Irish varieties, and together are a fine object-lesson of the high character of the soil of the Missouri river bluffs. We recommend that the sum of $4 be given the exhibit.

The four varieties of potatoes shown by J. H. Karnes are deserving of mention, as being fine and smooth—one being a seedling of the Peach Blow; we would suggest that Mr. Karnes give to the Society a statement of his success with it. We recommend that $1 be given this exhibit.

The exhibit of tropic and semi-tropical fruits, plants and grains made by L. L. Seiler, of Lake Charles, Louisiana, is remarkable for its richness and size of the oranges, quinces, Japan persimmons, figs, Japan chestnuts, pickled figs, Ramie and its cloth product, 40 varieties of sugar-cane, field-rice in the straw, two varieties of jute and the indigo-tree.

The sugar-cane, Mr. Seiler tells us, yields 30 tons to the acre, worth $4 per ton.

We have sampled the sugar-cane, and testify to its high saccharine qualities.

The exhibit opens up to fruit-growers a section of country heretofore unknown to us as to its vast possibilities, and we hope to hear of its future complete and successful development. Mr. Seiler has our good wishes for his highest success, and we trust he will bear to his co-laborers the most hearty good wishes of the Missouri Horticultural Society.

(Signed)

L. GEIGER,
D. M. DUNLAP,
J. F. WILCOX,
A. J. BLAKE,
Committee.

REPORT OF COMMITTEE ON FRUITS.

Your Committee on Fruits on the Tables beg leave to make the following report:

J. H. Bailey, New Mexico—Has 13 varieties of apples of large size and wel colored, and two varieties of seedling pears, one of them being perfectly flat, about the shape and color of a Domine apple, in quality fair, being quite sweet; also two samples of fine wheat and one sample of White rye.

D. S. Helvern, Mammoth Springs, Ark.—Twenty-six plates apples—a fair collection for this season.

Olden Nursery Co., Olden, Mo.—Thirteen plates of apples, including three plates of seedlings, which were considered the best seedlings shown at the World's Columbian Fair. The exhibit is valuable, as illustrating the newer varieties of promise.

S. W. Gilbert, Thayer—Has 58 plates that would rank as first-class in any season—among other varieties a seedling of great promise, showy, not quite so large as Ben Davis, but of better quality.

John Wilcox, St. Joseph—Eight plates of apples.

Conrad Hartzel of St. Joseph has a lot of apples two and more years old kept by his reliable plan of keeping fruits.

Three well-filled tables of apples, quinces and pears by the State Society, of very fine specimens. These were exhibited at the World's Columbian Fair. Notably among these are some extra large and fine specimens of Ingram.

From Southwest Louisiana, L. L. Seiler exhibits a collection of oranges and Japanese persimmons, Spanish chestnuts, very large Japanese quinces, also figs, indigo plant, rame, rice, and a large variety of sugar-cane.

All of which is respectfully submitted.

G. F. Espenlaub,
C. A. Keffer,
E. L. Pollard.

REPORT OF COMMITTEE ON FINAL RESOLUTIONS.

Resolved, That our thanks are due the Callaway County Horticultural Society and the citizens of Fulton for the cordial reception and hospitable entertainment given the members and friends of the State Society.

That we return thanks to those who have so ably presented papers for our instruction at this meeting.

That we especially wish to thank the Fulton band for the excellent music we have had during the evening sessions.

That we thank the local press for their assistance in giving notice of our work.

Signed by the Committee.

Adopted.

Mr. Michel spoke of the lack of flowers at the meeting.

J. C. Evans said it was the first meeting the Society ever held without an exhibit of flowers.

J. L. Erwin said that as the hall was occupied the evening before the meeting, it was impracticable to get flowers and other decorations arranged.

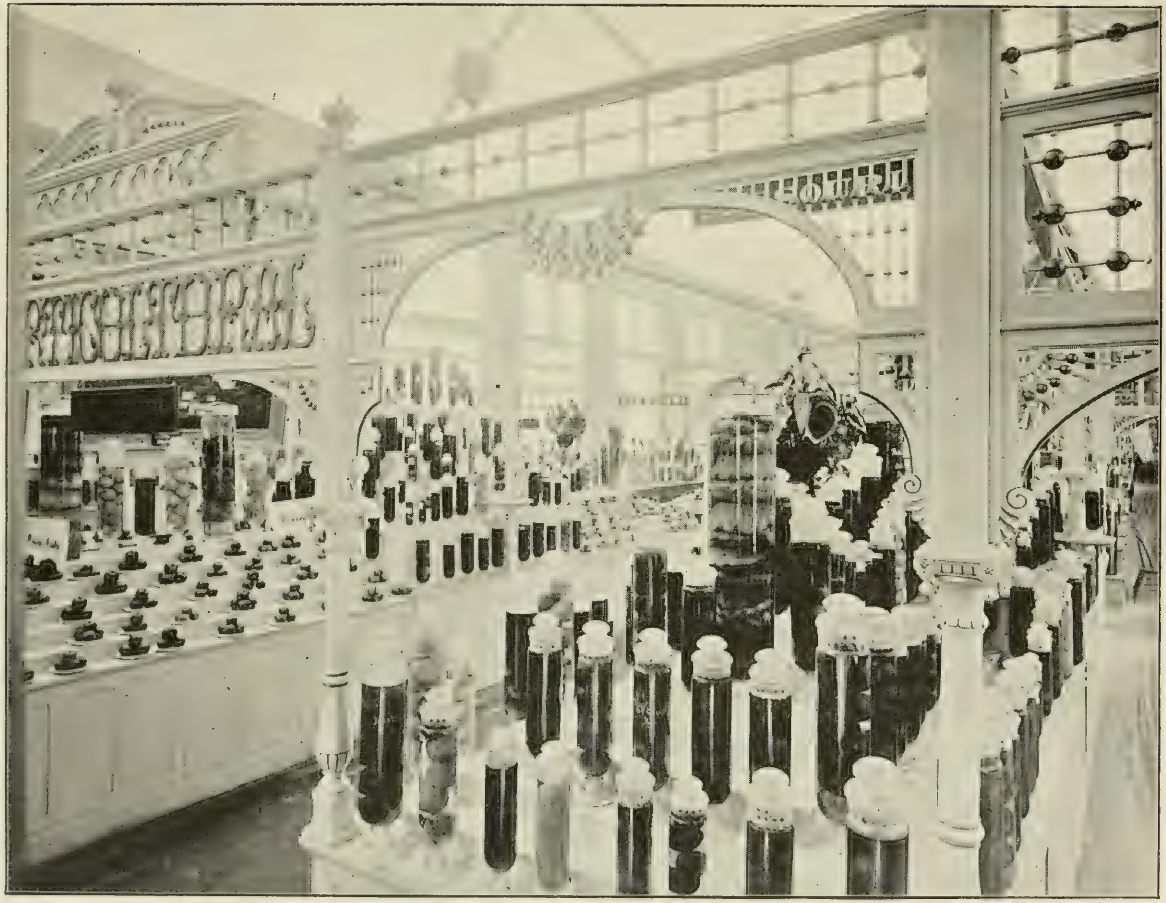
J. C. Evans—I thank the people of Fulton and the county generally for our reception. It has been a very pleasant and I hope a profitable meeting. The best of the fruit on exhibition will be packed and kept for exhibition elsewhere.

Secretary Goodman—As year after year we meet in these gatherings, I know we learn more and more of the needs of our State and the better plan to meet them. We are learning slowly, it is true, the adaptability of our soils and locations for our different fruits. We are learning more and more what our markets demand and how we can best reach them. The field opens up broad and wide for study and investigation, and we are seeking to enter and possess this information and this field. I am sure, friends, I have been delighted with this meeting. We have had some remarkably good papers and discussions. I have in my possession as many papers not read as have been read, and they will all go into the report in their proper places.

The earnest effort of the fruit-growers of the State to build up our work has been a delight to my heart, because of the united effort in the cause and of the hearty support the Society has had during our connection with it.

To the people of Fulton and to the earnest members of the Society I can but express my heartfelt gratitude for the very successful meeting we have had. I thank you all.

Society adjourned.



FRUITS AND VEGETABLES IN SOLUTION AT THE WORLD'S FAIR.

MISCELLANEOUS PAPERS.

PAPERS CONTRIBUTED OR SELECTED.

[A few extracts from a good horticultural magazine giving some items of information in a nutshell.]

Among the July magazines that are heavily laden with light stories for the beach, the hammock and the mountain cottage, comes one of another sort, "American Gardening," which is very welcome to lovers of nature everywhere, both those who find recreation in the flower and vegetable garden and in laying out and caring for the home grounds, and those who best enjoy the field, the forest and the stream. The July number offers something that appeals to each of these varied tastes. In one article it tells of the old-fashioned flowers "all along the banks of Kittery and the Piscataqua;" in another is continued an elaborate serial describing the Economic Plants of Japan—the Kudzu and the Daikon, the Ki-karasuri and the Agi-nashi, and all the rest, you know. Another serial, whose alliterative title states its well-served purpose, is "Taste and Tact in Arranging Home and Other Grounds," written by the editor, Elias A. Long. On one page we are told how to raise green peas, and on another how to keep down the green-fly. The pathology of plants is practically discussed in a long article, and notes from thrifty English gardens are given in a short one. The Missouri Botanical Garden is described, with a portrait of its philanthropic founder, Henry Shaw, and other excellent illustrations. The departments headed "Buds, Blossoms, Fruits," "Current Garden Lore," "Questions Asked and Answered," and "Dictionary of Seasonable Garden Work," fulfill their end by giving brief items of information, which together cover a wide range of topics. The illustrations throughout are excellent, as usual.—Rural Publishing Co., New York.

All along the banks of Kittery and the Piscataqua one will see a blaze of roses through the months of June and July, and the bushes are more than a century old.

In the old gardens around the Wentworth house, in Portsmouth—the same grand mansion that Longfellow called

> "Baronial and colonial in its style"—

Are many hedges of lilacs. They border the grounds, and even shut in one end of the mansion, with which they seem to hold sweet communion. When they are in bloom, here is a sight worth seeing. The whole air is scented for rods around with the fragrance of the delicate pale lilac blossoms. And they have bloomed here year after year ever since the lovely Lady Wentworth had the first ones set out in ante-revolutionary days.

For most of us the old-fashioned flowers have associations. I never see a spray of lilacs or breathe the fragrance of sweet-williams and mignonette without thinking of the old school-house where these flowers, placed in an old pitcher or bottle. stood on the teacher's desk through long golden summer days. And the roses I have plucked for my pretty school-mates, and the great peonies I have worn under my hat-band, and the bunches of poppies and hollyhocks I carried to cheer a sick friend, all come to my memory whenever any of these flowers pass under my notice. These old flowers have a meaning and significance that newer favorites have not. They speak of another time—of the life of past generations—and their very perfume revives romance rich and varied as any of those in the Decameron.—From "Flowers of the Old Gardens," in "American Gardening" for July.

PUERARIA THUNBERGIANA, Benth. (*Pachyrizus Thunbergianus,* Sieb. and Zucc.; *Dolichos hirsutus,* Thunb.). Jap. *Kudzu.*—This very remarkable vine grows wild in great abundance on the lower slopes of the mountains in Central Japan. It is a large, coarse, woody, deciduous vine, which in its mountain home twines its long, slender branches over bushes and trees within reach; or trails over the rocks and up the slopes on the bare ground, striking root from the nodes at frequent intervals, thus establishing new centers from which to radiate. It has no tendrils, but climbs by twining. The vines are of nearly the same thickness throughout, and the entire plant is covered thickly with short, rough hairs. The leaves resemble those of beans, having three leaflets raised on long petioles, rough on both sides and frequently lobed. The illustration shows the end of a young shoot, much reduced, and one of the young leaves outlined natural size. The plant has three distinct economic uses. The roots are fleshy, and yield starch of excellent quality; the tough fiber of the inner bark is manufactured into a sort of cloth which combines fineness with remarkable strength; and in certain situations the vine is unparalleled for ornament and shade. It is probably in this latter capacity that it will be prized in this country. The pueraria will thrive in any soil, though it attains its greatest vigor in a porous, rather sandy soil where the roots can push freely in all directions, like the soil formed by disintegrated scoria enriched by accumulations of humus, found on the mountain slopes of its native land. I know of no woody plant that can at all compare with it in its extraordinary rapidity of growth, even under conditions which do not favor best development.—From "The Economic Plants of Japan," in "American Gardening" for July.

It would be hard to imagine a surer foundation for estimates of planting done in certain lines than the sale of the respective classes of seeds by our leading seedsmen. This planting-gauge is especially reliable in regard to the onion crop. Every five or six pounds of onion seed sold means just about an acre of onions planted. In a similar way the spring sales of tomato and cabbage seed, seed potatoes, strawberry plants, etc., may serve as an indication of coming crops.

We asked the leading seedsmen how their spring sales of these seeds, etc., compared with those of previous years. Many of their replies are instructive in other respects, also, and full of significance.

From the tenor of all these replies we may safely infer: (1) That the area planted in onions is much larger than usual, and that, barring accidents, the crop will be one of the largest ever raised, and prices probably low. Yellow onions will be especially abundant, and white ones comparatively scarce. (2) That tomatoes were not planted as extensively in the north this year as in some seasons, and a surplus in the crop should not be looked for. (3) That fewer potatoes, especially of the early and fancy varieties, have been planted, and consequently that the crop will sell for higher prices than in 1891.—From "What Shall the Harvest Be?" in "American Gardening" for July.

We wish here to point out the gain that in many cases would result from substituting a graceful curve for the straight walk in the front footpath to the house, which, in ninety-nine cases out of a hundred, prevails. The gain would be five-fold in nature: First, as we approach the home from the street, it is a direct relief to the eye to have the house, in which straight lines and square angles everywhere abound, set off, by way of contrast, with a gentle yet bold curve in the outline of the approach. Second, to approach a house from such direction that a glimpse or suggestion of its side, in addition to the front, meets the eye, gives a more favorable impression than to come up from directly in front, with only one side visible; but this principle should not be applied to such an extreme as to make the walk lack directness, or to give it a strikingly serpentine course. Third, as seen by passers-by, a residence of almost any style appears handsomer when observed from the front across a stretch of lawn than when seen at the end of a straight walk, directly in front of it. Fourth, the advantages that have been named will appear about equally marked in reverse order—to a person standing on the front veranda or looking from the front windows. Fifth, in the present instance the location of a bold, irregular group of flowering shrubs directly in front of the veranda gives a better effect than if the same shrubs were arranged in one or more beds on either or both sides of a straight walk, as in the original plan.—From "Taste and Tact in Arranging Home and Other Grounds," in "American Gardening" for July.

When I began to grow roses in the city, I was told by a number of men clever in gardening that success in my undertaking was out of the question, because of smoke, dust, gases, foul air, etc. I paid no attention to their warnings or advice, well knowing that if the roses received six to eight hours of sunshine each day, and care such as is given by skilled men in the country, my chances for success were as good as theirs. I have grown pretty good roses of the leading monthly varieties in the city of Brooklyn for the last seven years.

Every year, about the first week in July, I set young rose-plants in fresh soil. The cuttings from which they are grown are taken from healthy plants the preceding December and placed in the propagating bed; they root in from 21 to 28 days. When nicely rooted I prick them off in flat boxes, setting the plants 2½ or 3 inches apart, and grow them on until they are large enough to be placed in 4 or 5-inch pots. Great care must be taken that the roots of young rose-plants are not broken when removing them from flats to pots. From the 4-inch pots my plants are shifted into larger ones before planting in those that are to hold them while blooming. * * *

Buds must be kept pinched out until the young rose-bushes are strong enough to bloom; with proper care they ought to be in good condition for this by September 30.

The house in my charge has a span-roof east and west, and is heated by hot water. I use for roses elevated benches five inches deep, with the bottom boards left wide enough apart to allow free drainage. I put a light layer of shavings over them to keep the soil from going through these openings. The benches are from 4 to 6 feet from the glass, and I use galvanized wire to keep the roses in place.

To keep down the green-fly, fresh tobacco-stems are moistened and strewn on the hot-water pipes; and the evaporating-pans are filled with a liquid prepared by steeping tobacco-stems in water. My roses are seldom troubled with mildew, but in such cases I dust sulphur lightly over all diseased plants; this is a sure remedy for mildew. The ventilators of the house are left open night and day until the evenings get chilly in September, after which I close the ventilators on the sides and shut down the top, leaving a little opening until obliged by cold weather to close tight. Night heat through the winter should range from 50° to 55°; day heat should be 60° in dull weather, allowing the temperature to rise 15° or 20° more with sun heat. I syringe the roses every bright day, heavily or lightly, as the occasion requires.—From "How to Grow Roses in Cities," in "American Gardening" for July.

In the year 1851, Henry Shaw, a prosperous merchant of St. Louis, Missouri, spent some time visiting the World's Fair at London and other points of interest in England. While walking through the famous gardens of Chatsworth, where the chiefs of the great house of Devonshire had for several hundred years lavished much wealth, Mr. Shaw first planned to have in his own country a garden of somewhat similar nature. It was here, according to his own statement, that he said to himself: "Why may I not have a garden, too? I have enough land and money for something of the same sort, in a smaller way." Out of these plans and questionings grew the famous Missouri Botanical garden and Tower Grove park, which stand as a monument of what Mr. Shaw has done for the cause of horticulture, for they were given by him to the people. The bequest will increase in worth and usefulness as time goes on, for it has a broad business-like basis. * * *

It was the aim of the liberal founder of these grounds to omit nothing that could make them the perfection of a pleasure-ground. Throughout the large area of the garden there are abundant walks and drives. There is a pool devoted to aquatics, a labyrinth, an observatory, a summer-house and play-ground, and a music stand and concourse, besides many other features designed to interest and amuse.

In its educational aspect the Missouri Botanical Garden occupies a unique place among institutions of its kind. Provision is made here for giving (free) adequate theoretical and practical instruction to young men desirous of becoming gardeners. The course of instruction in this department does not duplicate that now offered by the numerous state agricultural colleges of the country, but is quite distinct, and limited to what is thought necessary training for practical gardeners. * * *

The working year for the school of botany is divided into three terms. Classes for the study of particular groups of plants, and special work for advanced students, are planned as the demand for them appears. On the application of six persons, a class for day or night work, in any branch that can be taught with profit, will be formed whenever practicable. The elementary classes are so conducted as to require no previous knowledge of botany; but admission to advanced clsses depends upon a sufficient familiarity with the subjects to render the work profitable.—From "The Missouri Botanical Garden," in "American Gardening" for July.

In planting lilies, as everything else, white flowers must not be overlooked; as Ellwanger says, "White is the lens of the garden's eye," and in a class so generally conspicuous for its glowing colors we need the snowy purity of the Madonna lily *(L. candidum)*, or the stately waxen blooms of the tall Annunciation lily *(L. longiflorum)*. * * The use of tall-growing and showy bulbs is singularly effective in connection with shrubbery; the arrangement looks so delightfully natural, breaking, as it does, the monotony of similar sizes of shrubs or foliage. Certainly, the nearer we approach nature in arranging our gardens, the nearer we are to actual harmony; it is rather hard to imagine how we ever could manage to reconcile our consciences to carpet-bedding. It should be a great comfort to the lily tribe to feel that they can never be tortured into an even mosaic, looking more like a few yards of linoleum than a flower-bed. But there are plenty of misguided people still living who admire this form of garden art (?), and until they wake to the error of their ways we shall continue to see bedding plants misarranged after the model of carpets.—From "The Lilies of the Field," in "American Gardening" for July.

From Flower to Fruit.

BY EDWIN TAYLOR.

From flower to fruit is sometimes a long distance. Sometimes the fruit don't get there at all. Frequently the expectant vine-dresser, regarding his barren branches with melancholy gaze, finds no more hope in them than found Marianna of the Moated Grange when she cast her eye athwart the gloaming flats. At such times the empty-handed fruit-grower might be excused for wishing he had a bakery, or an undertaker's business, or a county office, or was in something where the returns are sure. Sometimes the bucolic victim of hope deferred don't get any flowers, either. But this is not a frequent experience. We mostly have blossoms. It is the recurring flowers that toll the horticulturist on.

Nature has sized us up just right, and knows about what we will bear. At the sight of the recurring flowers with each recurring spring, we don our harness and struggle through another season—too often to find at the end of it, when we think to draw our fruit deposits from nature's bank, as it were, this notice in effect staring us in the face: Closed for want of currants-cy, or whatever the fruit may be. If the flowers were to fail as often as the fruit does, there would be a stampede at once from the horticultural ranks. We are held to our places by that insubstantial fiction, a flower. The discrepancy between flower and fruit is frequently as marked as that between the show-bills of the advance agent and the actual tent performance: that is to say, that sometimes the blossom is remarkably fetching, while the fruit is a disappointment; and on the other hand there are many plants whose splendid achievements put their forerunning and inadequate flowers to shame. Who would dream, for instance, from the insignificant flowering of the wheat plant, of the enormous aggregate output of its fruit, or of its stupendous importance. Still more startling is the natural history of the sand-burr. If it has any flower at all the same has escaped my notice, but its fruit is something that no one can pass over without knowing it.

THE LOWER ORDER OF PLANTS.

In the lower order of plants (using the adjective not as a scientist, but as a layman, and meaning by lower orders merely low-down orders, like pusley and jimson), I have discovered that what I may call the probability of succession is more marked than in the higher orders. The pear, for example, is away up in the scale of plants—quite out of sight, in fact, in many orchards where the blight has been—and none but the very rash would dream of gambling upon its consequent fruit from its antecedent flowers. On the other hand, a low-down jimson (and nothing can be lower down than the jimson) never fails.

THEIR HOSTILITY TO THE HIGHER ORDERS.

One great distinction between the low-down orders and the high orders of plants, according to my classification, has never been emphasized by the professional botanists, but will be at once apparent to all who have had practical experience in field or garden, when pointed out. It is this: that whereas everything in nature (except man) posessing the possibilities of destruction is actively hostile to the higher order of plants like the pear, with the low-down orders, like the jimson. the situation is exactly reversed, and man is the only thing against them. The foes of the higher orders are like the sands upon the seashore for number, so that the interval from "flower to fruit" is for them filled with pomological honors, and when these enemies of fruition are properly illustrated by means of sun-pictures representing them on a scale of some millions to the inch, they look so frightful, particularly when their shape is considered in connection with their overwhelming numbers, that a disinterested observer must wonder how a single fruit does here and there get through the lines of the fungi and the helvetii, the phylloxera and the bacteria and cogomica and aphidæ and peristyles, that seek to thwart the fair scheme of nature that begins with blossoms and is scheduled to end with fruit. On the other hand, consider the jimson how it grows, and tell me what borer, or root-louse, or curculio, or gouge, or coleoptera, or lepidoptera, even so much as threatened the peace of the aforesaid jimson, or demanded a recount or a delimitation of its frontiers. Nothing of the sort occurs. The jimson goes right along in the middle of the row, like a Populist, and when you read of the flower of the field that was cut down, why that was more than likely the work of some exasperated farmer among his jimsons.

THEIR PERSISTENCE.

Then again, in both its flower and in its fruit the jimson is markedly different from the fruit that makes you rich, when you have any, in point of perseverance. Take a grape plant or a peach tree for instance: if anything happens so that they can't flower at just such a season, they won't flower at all; while a jimson will begin before it is time to start if it is only big enough, and keep right at it with a diligence worthy of a better cause till stopped by destruction or frost. A thrifty jimson and an average quince-tree are about the same size; the fruit of one is elegant in its way, the fruit of the other is absolutely worthless for any purpose but that of its own reproduction. Perhaps you will get one luscious quince for fifty blossoms; the jimson won't miss once; its flower will scarcely be dropped before the fruit will be ready while you wait. But the jimson won't wait; it will go right on putting out more flowers and putting up more fruit, when there is already more than enough, just like some housekeepers I know. Those plants that make the most fuss with their flowers are commonly of the least account for their fruit. Frequent illustrations of this can be seen on river bottom farms, where the old-time practice still holds of raising morning-glories and corn together. These two crops supplement each other in a most interesting manner; the corn holds the morning-glories up, and the glories hold the corn together. There have been fields of corn in the adjoining county so thoroughly bound up in this way that it would be impossible to abstract one hill, I am told, without sending a quiver through the whole field. It is not of that, however, which I wish to speak, but of the fact that the gaudy flower of the morning-glory *(amora gloriana)* results in nothing better for fruit than a pestiferous little burr, while the corn, with no flower at all to speak of, when it comes to fruit just takes the cake; at any rate it *makes* the cake, and whether the same appear under the correlative of Johnny (diminutive of John), or in the semi-fluid manifestation of mush, the same is a prominent factor in every well-regulated American household.

POOREST FRUIT, FINEST FLOWERS.

Even in plants of the same kind, it must be correct in the main to say that the poorest fruit grows with the finest flowers. My attention was called to this phenomenon last spring when the peaches were in bloom. The peach named Mountain Rose, which, to my mind, represents the very high-water mark of delectableness in fruit of whatever name, came out with comparatively tame blossoms, while a little ornery seedling cling-stone bloomed forth like a garden. I do not feel like laying down any hard and fast laws on this point in the domain of horticulture, where I am, as it were, but a novice, but in my own familiar field of ornithology the inverse ratio that obtains between fine feathers and fine birds has passed into a proverb.

Thrice and four times blessed is the one fruit that does not have to advertise itself by its flowers, though sometimes out of good nature it may present them. I refer to that delicious tickler of the palate, the rich man's luxury and the poor man's necessity, the *pomme de terre* of the French, or apple of the ground, better known with us as the fruit which grows at the root, and to which, out of respect for the nationality of its most advanced admirers, we fix the word "Irish," or call it, in the language of the market place, "spuds."

My subject, I ought to remind you, is not one of my own selecting. It was chosen for me by a committee that means to be fair to all, and in pursuit of its duties it gave out subjects for these monthly essays, poetical and otherwise, suited to our different capacities. In my case I am a victim of one of their mistakes. They got the names mixed like the twin babies in the story, and I, who am no poet, drew a poet's part. My theme is, indeed, full of possibilities for one with an ear for numbers, but saddening to one who in three long years has sat up nights to get the returns from an orchard that don't come in.

Had the harmonies and proprieties been observed, my subject would have been "Flour and Fruit," with a judicious mingling of such additions of shortening and sugar, salt and saleratus as taste demands. Upon that text I could discourse with the feeling of a confirmed picnicker, for the conclusion of the whole matter so formulated is that delicious American confection, pie.

Discoveries.

BY A. CHANDLER, ARGENTINE, KAS.

According to the program, I see I am down for a paper, though I will fail to interest any one, except I were to write about the Silver bill, World's fair, or kindred subjects.

My subject is "Discoveries." I have nothing new to offer. I shall note some things that we have not discovered, and will endeavor to give what appear to my mind some of the reasons why.

So rapid has been the march of science, of art and mechanical application to almost everything, that we discover that we are a good way behind in the procession.

Science is able to follow the planets through the trackless heavens, to compute their orbits, to calculate the return of an eclipse, with unerring precision; but if science in horticulture is called upon to give us a specific remedy for the "pear-blight," it is disconcerted, and we are referred to the mysterious ways of Providence.

Our colleges teach Latin and Greek *ad infinitum*, universities give diplomas in law and in medicine, and yet horticulture, the oldest, and I may say the most important occupation of man, is left to struggle with its uncertainties. No formula is given us, the working out of which would insure us next year's fruit crop. Nothing is here intended to reflect discredit on the life-work of many eminent horticulturists. The after-glow will reach on through many years.

Very much has been written for the benefit of fruit-growers; it is too often cast aside; it is not given a place and the importance that it should have. The partial failure of the fruit interest of this central portion of our country is the neglect of many to give the subject proper attention. If we will but give the orchard and the farm that attention that is requisite in other callings, we believe that other results will be manifest.

I will digress here a little and pay my respects to those who have left the orchard and the farm. Why this exodus to swell the superfluous population of our cities? We may commence with Homer and Cincinnatus and follow down through the centuries; all the way we have the best of company and the most learned. The truth is, friends, too the many of our people are living on 25-foot lots, that might be kings of the orchard and the farm. Why this choice for brick pavements over fields and forests is not yet explained. A little missionary work on their account by this Society would not be out of place. God made the country, man made the town. Of the two, we think the country was better and more honestly made. We have, within a radius of 100 miles of where we are now standing, a country that perhaps is not excelled by the historic land which Caleb and Joshua saw. The principal thing lacking is faith to go over to possess it.

Even along the famous Kaw are locations where the disappointed "Strip" boomer might find both health and happiness, and possibly a competency. Our first parents were given a garden and told to dress and keep it; this Society can do much to induce man to return to his best inheritance. Let us not part with our best life blood without a struggle.

But to return to the fruit-grower: he needs to be a thoroughly scientific person, with a knowledge of both botany and chemistry. So many things conspire against him that he needs to know all that is to be known. Skill and energy, with an intelligent knowledge of the business, will insure success. Science is reaching in every direction; it will not pass by the horticulturist. Now to sum up what we all need is to embrace all that the past will give, all that the present can teach us, and an implicit faith in the future. We have the country, we have the brains and brawn, we have our agricultural colleges with their splendid endowments; with the right use of all these will be evolved the ideal methods of the Twentieth century fruit-grower.

Orchards.

BY H. W. JENKINS, BOONVILLE, MO.

This heading is a broad one. It covers a vast field and is susceptible of many subdivisions or heads, which will probably all be treated upon and properly cared for by papers from more able writers, men of more mature judgment, wider experience than the writer of this article.

At such meetings as the present we take it for granted that all who take part should write or talk from actual experience, from facts, not fancies. I shall confine my remarks to the planting of the trees and subsequent care for the first five years, leaving the other subdivisions, such as "Age of Trees," "Varieties," "Pruning," "Marketing of Fruit," "Spraying," etc., to those who follow, as our experience in the "orchard business" has been altogether confined to this, having planted three orchards in three different counties of this State, but unfortunately, being of a rambling disposition, have not remained long enough in one place to gather the fruit. I suppose, however, we should be contented with our present location, for we recently heard an eminent divine say in his sermon "that the Mississippi valley was the heart of this nation, and that Missouri was the heart of this heart;" and as

Boonville is near the center of Missouri, it is easy to see that so far as location is concerned, we are surely near the right place.

The first thing to be done in starting a new orchard is choosing the site or location. Always select the best drained and most elevated portion of the farm, because frost does the most damage on low land. If possible, before planting subsoil your ground, as ground prepared that way stands drouth better, and will also drain off better in a wet season. In planting, dig large holes—the larger and deeper the better—being sure to refill with good top soil, so that the tree will stand when planted at about the same depth as in the nursery row. This applies to all kinds of trees except dwarf pear, which should be planted deeper. Prune the roots back to fresh green wood, cutting off all broken and bruised roots. Set your tree by carefully spreading out the roots on all sides. Put in mellow top-soil about the roots, and be sure to firm the dirt down solid so as to exclude all the air from the roots, so that when you are done planting, the tree, upon taking hold of it, appears solid and fast as though it had never been transplanted.

Stand your tree as nearly perpendicular as possible. Do not lean it in any direction, as when that is done nature will try to rectify it by throwing out all new growth on the upper side to preserve a balance. For proof of this, go into the forest and observe the growth of trees in their natural state. After your tree is planted, cut back the top on apple and pear at least one-third, and if the top has been formed in the nursery row nearly all on one side, then cut back to a switch and grow a new top. Peach should always be cut back to a switch. Give your tree the proper shape while small, always aiming to preserve a well-balanced top, afterward cutting away only such branches as cross each other and rub together. When it becomes actually necessary to cut off a large limb, be sure and cover the wound over with grafting wax or paint to exclude the air and water, to prevent decay.

CULTIVATION AFTER PLANTING.

It does seem to the writer that the average Missouri farmers use the poorest judgment and the least common sense about their orchards after planting than any other work which they do. They seem to regard the successful growing of a tree as some mysterious art not to be learned by every one, when they only need to use some brains and muscle, good, hard common sense, and look on a tree as a thing of life, the same as a stalk of corn, that needs help to manure itself in order to bring profit to the owner. About nine out of ten farmers expect their trees, after being planted, to grow and bear fruit without anything more being done to them. A fatal mistake, as many a dilapidated orchard in this State stands a silent witness of such treatment. A tree needs more and better cultivation than corn and potatoes, especially the first year after planting. But do they get such care?

It matters not how or in what way a tree has been propagated, whether by budding, whip-grafted, cleft-grafted, a piece-root or whole-root used, or grown from a cutting, so it is a good, straight, thrifty, well-rooted tree with an evenly balanced top (a good tree is a good one and a poor tree is a poor one). It all depends upon the planter, upon the care he gives to it, whether it ever becomes a tree and bears fruit. Cultivation is the one thing needful; cultivation is the essential part above all others; what we would emphasize above everything else—cultivate! cultivate! Keep the soil loose and the weeds down around your trees, but remember to give only shallow, level cultivation; and the best implement to do this with is the Planet Jr. horse cultivator, using the sweep shovels. These leave the ground nearly level, and do not penetrate more than two or three inches nor disturb the roots. Grow only hoed crops in your orchards. Do not sow any small grain in orchard, unless you leave a strip along the tree row to cultivate in the manner above stated. All cultivation should cease by September first each year. Keep up the cultivation for five years, then seed down to red clover. Keep out the borers and keep off the rabbits. Do not allow stock of any kind in your orchard. Treat your trees in an intelligent way, as things of life, and success will crown your efforts, and future generations will rise up and bless you for the work done.

Orchards.

BY J. B. DURAND, PRAIRIE CITY.

Location and preparation of these are of much importance and interest to the orchardist and fruit-grower. The most important point in any undertaking is to get started right, to have a good foundation upon which to build; for on that depends the future success and importance of the structure. So, with David Crockett, we say, "Be sure you are right, then go ahead." With the orchard the first and most important point to be secured is the intelligent selection of a location. In considering the subject of where to locate, whether in the east, the west, the north or the south, I would select neither, but just settle down in this grand State of Missouri, the grandest fruit State in the Union. Anywhere within its borders are to be found desirable locations, both on the hills, in the valleys or on the plains.

We must remember that all countries and localities have drawbacks sometimes and discouragements to contend with. So with this. The failure of the apple crop the past two seasons in Missouri is very discouraging. But we must remember that after darkness comes light, after the cold and dreary winter comes the mild and gentle spring, with its bright sunshine and beautiful and fragrant flowers; after failure often comes success; so we look forward to bright and prosperous times just before us.

But since we have selected this grand old State as the general location for our orchard, I will not designate which part of it, for each has its peculiar advantages. If for a commercial orchard, one should get convenient and easy access to the various markets. Then whether on the hill or in the valley, select a location that has an open, well under-drained subsoil. This is very important; any soil will do that will grow a good crop of corn, if the subsoil is all right.

Both the hills and the valleys have their advantages. The valleys are more protected from the cold blasts of winter, and thereby often escape winter-killing when they are killed on the hills. But then the valleys are more liable to late frosts in the spring, and the fruit is often killed in the bloom, while that on the high land escapes. I would in this latitude prefer a northeast slope, so the buds will not put out so soon in the spring. I believe that timber land, as a general rule, is preferabls to the prairie, especially if the surrounding timber is left standing as a protection from the winds.

Stony land can be used often to good advantage; some of the highest colored and finest flavored apples I ever saw grew on land that was so stony it could not be plowed. The holes were dug with a pick and crow-bar, the trees planted, and nothing more done. They grew slowly, about one-half as fast as trees on good mellow land, and cultivated, and were loaded with apples when quite small.

In the preparation there is not very much to do; plow it well and deep, pulverize it thoroughly; mark it off each way the distance you wish to plant the trees, say about two rods each way. A lister is the best plow for marking, as it opens a wide furrow and makes the center of the furrow in line with your stakes. Clean out the cross with a spade sufficiently to receive the roots of your tree without cramping, and deep enough so the trees will stand about one inch deeper than they did in the nursery. Fill up and press down carefully among the roots. The fall is the best season, as the winter rains will settle the ground thoroughly around the roots, and they will be ready to start off early in the spring. But you can plant in the early spring, if more convenient, and they will do well.

Orchard Land Is Abundant.

BY CONRAD HARTZELL.

In most parts of the United States is good fruit land when properly and thoroughly prepared before planting. There is some preference on hill slopes in some kinds of land, and for some kinds of fruits. Latitude and longitude must be considered for best results. Proper and sufficient drainage must not be neglected when and where necessary; in fact, there are many natural great advantages in locality for tree growth and fruit development, both in soil and climate, and as well in kinds for profit.

One thing, however, is the leading theme of this communication, and of great necessity in planting, to plant the young orchard as other fruit: namely, plowing the ground whether fertile or impoverished, old or new, whether level or rolling.

All solid or compact fruit lands, in all localities, for best results, should be very deeply and most thoroughly plowed before the trees are planted. This part of the preparation for tree-planting has never yet been overdone, but is almost invariably underdone, thus causing short-lived and unprofitable orchards seen in so many places. Unhealthy and sun-scalded trees are the result of improper and insufficient preparation of the land before planting.

Many persons suppose that sun-scald is only seen on good-bodied trees. This is a great mistake; it is the mistake which gave rise to that erroneous plan of trying to grow trees without a body—simply with roots and tops—which are always unprofitable and short-lived. Sun-scalded or unhealthy young trees are never seen on well-prepared land, if the trees were properly planted and otherwise well cared for. The term is a misnomer in that sense, and has led many men into a wrong belief, causing them to err in a very vital orchard interest, so universally seen on all sides: namely, trees (so-called) without a body, ugly, unsightly, scraggy bunches of brush cumbering the ground by tens of thousands all over Missouri and other states, planted and grown quite close together, which is another mistake in the same fruitless direction. Too many trees to the acre is very much like trees without a body—of no account.

In order that those who are contemplating planting orchards for profit, this writing is prepared for a guide in the most important matter to know, and first to be considered, in growing an orchard for profit anywhere. Therefore, it is advised that wherever choice is made to plant an orchard, the first thing to consider is the preparation of the land, not only to make it rich and drain properly, which are very important matters and highly necessary; but above all, and certainly before planting the trees, have the ground most thoroughly and very deeply plowed, not only in tree-rows, but the entire orchard. Very many persons think it sufficient to make a hole in the hard earth just big enough to hide the roots of the tree. This gives rise to all the trouble set forth, as before mentioned, sun-scald, etc. Thrifty young trees carefully planted in well-prepared land, whether given a long or short body, will not be troubled with sun-scald or slow growth, but will live long and be profitable. Owners of such orchards will be progressive and public benefactors.

The Best Plums, and Why.

BY JACOB FAITH.

Our worthy Secretary assigned to me for this meeting the subject "The Best Plums, and Why." This paper I feel more able to write, and state the value of plums in an apple orchard. My experience in testing new varieties of plums and seedlings was unprofitable. I believe more failures are made planting plum-trees than any other tree, by not knowing what variety to set for our latitude, and how to fertilize.

VARIETIES.—Catto Chief is the first to ripen, but late frost often kilis them, and they are too small for market. Three weeks later the Wild Goose ripens, which is more profitable with me. Miner and Weaver are much like the Wild Goose. Fourteen days later Crimson Beauty ripens. It is a good bearer, smaller than the above, but better for preserves. About the same time the Brown's Late ripens, a shy bearer. Golden Beauty is one of the latest to ripen. In color it is a greenish yellow. It is less subject to curculio than any I know of, but it is subject to over-bearing, and thus the fruit is small. It is also subject to cracking or bursting, like the Rawles Geniting apple, after a dry spell when fall rains come. Blue Damson is a very shy bearer. Mariana failed in what was expected of it. Abundance, with me, has not borne yet, but from what I have seen and learned, I believe it will be a profitable plum for Southwest Missouri. Other varieties were tested on my place, but failed to yield satisfactory crops. With all my study and experience, I do not understand how to plant to give the best results in fertilizing each other. I am convinced that plums should be planted of alternate varieties. Some varieties are poor bearers when depending on their pollen, and will improve when intermingled with other sorts. Again, if the weather during the blossoming period is hot and windy, one variety may waste its pollen before the stigmas are ready, and in such cases the pollen of adjoining sorts may supply the want.

That plums will reproduce from the seed the same as the parent tree is a mistake. I tested over 100, and not one was the same as the parent tree. There are several sorts of peaches that will reproduce. About 15 years ago we planted 60 Wild Goose plum-trees, 40 of which were budded on seedling peach-trees, and 20 were grafted on seedling peach roots. (For grafting plums we use whole roots; graft at the crown, using as nearly as possible a graft or scion the size of root.) The 40 trees budded on peach stock commenced dying at six years old, and are now all dead. These 20 grafted on peach roots soon grew on their own roots, and over half are yet alive and healthy. A plum-tree grafted as described will throw out sprouts which certainly will bear the same fruit as the parent tree. I prefer those sprouts of plums and Early Richmond cherries to those budded on other stock. It is true a plum budded on peach stock will come into bearing one year sooner, but those from the sprouts will make much the healthiest tree.

Further, one-half of my early cherry trees have been killed by gophers eating their roots off, while I seldom lose a sprout grown from a grafted tree. Some object to sprouts. If hogs run in a plum orchard they eat them before they get 10 inches high, and cherries will sprout but little—not enough for me to supply my neighbors. Plum-trees will get their full growth in about 8 years. I plant 12 to 18 feet apart, owing to variety and soil. Plums budded or grown on peach stock require the same kind of soil and culture as peaches. Where grafted, they soon grow on their own roots. They need more moist land (but bear best on dry land) and require less cultivation after the second year, and are much less subject to borers. The plum tree doesn't need much pruning, but more than the cherry, and not one-fourth as much as peach-trees. The pruning should be done while small.

KILLING THE CURCULIO.

If spraying is preferred, commence after the bloom drops. I prefer jarring at early morning. Hogs will soon learn to follow and eat more than ten times as many insects as they do in apples. Saw off a limb to make a place to strike on, as it requires a sudden jar to bring down the stung plum in reach of the fowls or pigs, which are indispensable in the plum orchard. Where hogs and poultry are not allowed to pasture, plums should be picked up. The curculio will remain in the plum about nine days after it falls; in apples for months. The curculio prefers the plum to the apple. A stung plum will fall to the ground. Only a few insects reach maturity in the plum, while in an apple they stay while on the tree, under the tree, and even where stored for winter. The curculio will deposit eggs in both cold and warm weather; but in cold, wet weather they will seldom hatch.

A few years ago I was alarmed about plum-trees in my apple-orchards, as I have over 300 planted between Standard apple-trees to be cut out when the apples need the room; but I have since learned that plum-trees are profitable to an apple orchard, both for fruit and as insect destroyers. I have noticed my apples that grow within 100 to 150 feet of plum-trees are freest from worms. Why farmers and hog-raisers don't grow plums for their hogs I can't understand, when one acre of plums produce more hog-feed than three of corn, with less than one-tenth the labor. They ripen in a time when corn is scarce and when hogs need a change of food. I have made mistakes by shipping too ripe.

I believe no tree needs more study than that of the plum, while no tree fruit has received so little attention. Yet few are more attractive in appearance or more pleasant to the taste. No fruit is more tempting than a well-ripened, beautifully tinted, juicy plum. Its color is like a gleam of gold; its cheeks are delicate and soft, and it breathes a delicious perfume, causing one to yield to the temptation to bite into the golden skin. No preserves are more delicious than that of well-ripened plums. One of the best qualities, which I had nearly forgotten, is, the plum can be grown by a lazy man.

A Vineless Sweet Potato.—In the cultivation of the sweet potato, a point is to keep the trailing branches from rooting in the ground; if these creeping branches get roots, it is so much taken from the main crop; all the roots are comparatively small and valueless for commercial purposes. For this reason the cultivator of the sweet potato has to be continually moving among the vines, lifting them from the ground by various methods in order to prevent these branches from sending out other roots. It is now given out that in Florida a variety has been raised which takes on the bushy form without any tendency to run or sprawl over the ground. If this be so, it ought to be one of the greatest advances made for many years. As a general rule, varieties of the bushy class are not as productive as those which take on a regular climbing character. The bushy varieties are not nearly as productive as the taller growing kinds, but the sweet potato may be an exception, as the crop is under ground.—Meehan's Monthly.

Cold Storage for Apples.

One important point has been settled by the experience of exhibitors of apples at the Columbian Exposition, that deserves attention. Cold storage has been a success in the preservation of apples in prime condition, from picking season until July. All of the apples were held in cold storage. The method of packing adopted by substantially all the exhibitors was the same. When the fruit was picked from the trees in the fall, each was immediately wrapped in a piece of thin paper, and then packed in tight barrels with loose cooperage, such as flour barrels, and thus shipped by rail to Chicago, where they were stored in cold rooms, and held until their removal in May and June, at a temperature of 33° F. They would, no doubt, have withstood 32° degrees without freezing; but 33° has been found satisfactory in every way. There was no attempt to ventilate the fruit. All the apples so picked and stored, whether they came from New York, Illinois, Missouri, Minnesota, Michigan or Wisconsin, came out in prime condition, bright in color, sound, and fully as rich in flavor as they were in the fall. This was conspicuously true of Pound, Sweets, Fall Pippins and other varieties of fall apple which are classed as poor keepers, and are usually gone before Christmas. In a few instances the skin showed in May and June a slight scald, but the pulp below was perfectly sound under the scald, and when the breaking down came, two to three, and even four weeks later, the signs of rotting were as likely to appear under the bright skin as under the scald.

In the New York exhibit of apples were one lot of Nellis and one of Fall Pippins, which were treated, in picking and packing, the same as the other fruit, but were, by accident or carelessness, frozen solid in a cold storage house at Rochester, where they were temporarilly stored. Yet when these were carefully thawed out, by a slow elevation of the temperature to above freezing, they were then shipped to Chicago and held, like the rest, at 33° until April or May, when they were put on the exhibition plates. When I saw this fruit, May 24, it was perfectly sound and good, though an expert could detect a slight depreciation in the richness of flavor, due, no doubt, to the freezing. All of this fruit shown by the states named kept in good condition from two to three, and some even four weeks on the exhibition plates before it began to break down, showing conclusively that the system of cold storage is amply able to carry over apples from one season to the opening of the next, and turn out the fruit in condition to market safely in warm weather of the early summer.

Canadian apples, similarly picked and packed, were consigned to a different cold storage; their wrappers were removed and holes cut in the barrels for ventilation; temperature fluctuated from 33° to 43°. Most of the lot was ruined, and but few of the balance would stand up on exhibition more than a week or 10 days. The lesson of this experience is obvious.—E. G. Osman, in "American Agriculturist."

Pruning Grapes.

Many experiments have been made under different conditions to show the advantages of pruning the grape, where a proper medium is observed between too light pruning and excessive cutting away. We have seen a vineyard ruined in a single season by cutting away nearly all the bearing shoots, the mistaken notion being held that they would ripen better by letting in the sunlight. The leaves being mostly cut off, the remainder nearly starved the fruit. The Missouri Experiment Station tried pruning different degrees of the vine. The vines were pruned from one bud to six buds, one portion not being pruned at all. Another part of the vineyard was allowed to grow four canes from the root, which were pruned to three feet long. The fruit subsequently reached its full size. The grapes which were pruned to one and two eyes had well-filled bunches, the berries being one third larger than on the unpruned vines. The rot was much worse on the unpruned. There is fully four times as much rot in the unsprayed vines as in those that have been sprayed.—Country Gentleman.

LUMINOUS FLOWERS.—It has long been placed on record that the daughter of Linnæus saw flashes of light, supposed to be phosphorescent, coming from fraxinella flowers. The list has been added to occasionally, but not to a great extent. The nasturtium is said sometimes to present this phenomenon. Some sunflowers and the French marigold have been included; and Mr. Mauriceson, of the Golden Gate park, San Francisco, states that the Australian poppy will frequently send out flashes of light. What species of plant is intended by the term Australian poppy?—Meehan's Monthly.

Care of the Orchard.

No one should set out a new orchard unless he is sure he can give it both manure and mellow cultivation. A small one of a few acres, bearing yearly rich and beautiful specimens, is better than a neglected one spreading over wide acres. There will be more profit in the small and perfect one than in the one extended and neglected. Until planters who have the means avoid this superficial practice, they will continue to set the unwholesome example to others, and perpetuate to a great degree the slipshod style of orcharding. It is well, therefore, for the planter to determine beforehand what special attention can be given to the trees, and fix on the size of orchard accordingly. Cultivation alone, keeping the soil clean and mellow for several years, may answer while the trees are young; but when they come into heavy bearing, this large annual draft can be supplied by an annual, or at least biennial, top-dressing, in the autumn or winter, of rich barn manure.—Country Gentleman.

The Keiffer Pear.

Editor Journal of Agriculture:

This pear is outgrowing its former reputation, and is rapidly coming to the front as a fruit of fine quality and appearance. It has good keeping qualities and other good points. In order to receive its just deserts, it needs to be handled properly at the right time. This pear also needs thinning out at least one-half as soon as the fruit is properly set, for it is a very heavy bearer. People as a rule don't like to thin fruit, but in many cases fruit left remaining will more than pay for the labor and the apparent loss.

Always gather this pear, or any other, for that matter, when the stem will part readily at the joint, by simply lifting the pear upward in your hand. Place away in a dry, cool place, and cover with some old carpet, blanket or other material. Go over them and sort out and grade by size and quality, say, No. 1, free from worms, and nice in every way; No. 2, a little wormy and a little uneven, but fair size; No. 3, small, specked, uneven, but will readily sell at home for 50, 60 or 75 cents a bushel for canning or preserving. There is one peculiarity about Keiffer pears. You can take small, hard, green pears from the trees in August, and they will prove excellent both for canning and preserving· Would hardly believe it, but know it to be so from experience. What prolific bearers they are! I have trees seven years old that give from six to ten bushels of fruit. That seems a strong statement, but true, nevertheless.

The trees should never be trimmed back. It might do to thin out small limbs crossing each other; but would avoid cutting back, as they bear so much toward the ends of the limbs, these limbs will break off somewhat, but they will keep coming. This tree is a very strong, upright grower before bearing, the leaves being a very rich green; in fact, the tree is a very handsome one, and in the autumn when full of rich, good-sized orange yellow looking fruit, it is a sight to behold. And later the leaves will turn to a beautiful autumn color of reddish brown.

After bearing a large crop or two of fruit, the trees begin to have the appearance of some drooping variety. The fruit for eating purposes has been made all sorts of fun of; but I want to say that according to my way of thinking (and believe I like good eating fruit equal to anyone), it is, if properly handled, equal in flavor to a Bartlett; and where can you find a better pear for flavor than a Bartlett? As to profit—that is what we are after, at least those of us who grow fruit for commercial purposes—it can't be beat. Last two years I received on South Water street, Chicago, $1.00 per one-third bushel basket for No. 1, 80 cents for No. 2. What will beat that?

E. G. MENDENHALL.

Purposes of Life.

G. W. WATERS, CANTON, MO.

There are two conditions in farm life that mar, in some measure, its fullest enjoyment.

1. There are not the facilities for intercourse that exist in towns and cities. It seems to be the normal condition of man to mingle and commingle with his fellows. Hence, we believe this is one of the inducements that cause so many of our people to seek urban homes. The fascination of fellowship and companionship has caused young men and young women to flock to the cities and towns. It is not so much the excessive labor in farm life, for labor incited by proper mental conditions is not only endurable but pleasant. This condition of isolation which precludes intercourse and daily fellowship is being largely modified by increase of population, the multiplying of farm

homes in a given area, and, also, by improved roads. Hence, roads have not only a commercial value, but are great moral agents and promoters of happiness as well.

The second condition that has hitherto been a great drawback to farm life is the want of mind employment in immediate connection with our business. The assumption has been that to be a successful farmer or orchardist, one needed only good muscular development and a dogged determination to work from early morn to dewy eve. Brute force, main strength and awkwardness, with parsimonious economy, whereby nearly all the finer pleasures of life have been denied, has been pointed out as the only sure and feasible road to success in agriculture. Is it strange, then, that a young man whose whole being is enthused by aspirations engendered by mental activities, should look upon this dark picture of farm life with aversion? Or that, contemplating its isolation on the one hand, its dull monotone drudgery on the other, he should cut loose his moorings, go to the city where the conditions are such as to gratify the cravings of his nature?

I heard Col. J. W. Judy, the great live-stock auctioneer, once in a speech just before offering for sale a lot of Short-horn cattle, say: "These animals have a history. Buy them; take them upon your farms that your sons may handle them and may find in their history, in their pedigrees, a chance for the exercise of mind activity, for it will require intelligence, thought, to handle them and breed them properly." He urged upon his audience the necessity of intelligence and thought in connection with every daily labor as a factor, not only in lightening toil and giving it zest, but rendering farm life attractive. I am pleased to note wonderful improvement along these lines. Facilities for intercourse have largely improved; the necessities for intercourse have been more and more recognized, and in no department of farm life has the advance been more marked and satisfactory than in horticulture.

I have noticed, while engaged in the Farmers' Institute work, that the men who are enthusiasts, who love their calling, whose minds are active, who have thrown off the lethargy so disastrously common in farm life, are those who have exercised mind activity and enjoyed that intercourse with their fellows which is "the soul of progress." Hence when we learn of the existence of a horticultural society in any given community where we are to hold a Farmers' Institute, we expect a good attendance and interest, and our expectations are always realized.

Recognizing these principles that enter into the make-up of the character of youth, and I may say of older persons as well, it is just as important to furnish wholesome mental food to go along with labor as it is to furnish food for the body to prepare for that labor.

No other avocation furnishes more opportunities for mind activity in immediate connection with its business transactions, than agriculture. We have to do and to deal with nature and with nature's laws. To know these laws of nature, these principles which are immutable, is the basis of horticultural and agricultural knowledge. Hence, the farmer is a scientist, in that he knows much of nature's laws. Nature has taught the scientist all he knows. The grand progress of the Nineteenth century is the outcome of accurately determining what the forces of nature are and the proper combination of these forces. The powers of electricity were observed during all the ages of human history. Its force was observed in the crushing violence attendant upon the thunder storm. The idea of using this wonderful force and causing it to become the obedient servant of man, was reserved to the Nineteenth century. In a great measure the same may be said of steam. The inhabitants of earth had witnessed, from time to time, the force evolved in combining heat with water. The most tremendous exhibition of force the world ever witnessed was that of the volcano. Yet man had never thought to use that force to his own good till a much later age. In agriculture, in horticulture, we have to do and to deal with silent forces, yet forces as potent as the more observable ones. To know what these silent forces are, to know how to apply them in our business, in such combination as shall bring the best results, becomes the problem for solution. To the intelligent horticulturist a study of nature and of nature's laws becomes a source of pleasurable mind activity, and a compliance with these laws is the acme of agricultural intelligence.

Notwithstanding the fact that so little attention is given to systematic study of nature and her laws, yet by daily contact with these things the farmer, the farmer's sons and farmer's daughters attain a strength of intellect that is marked and notable. This inherent strength of intellect is evidenced in the marvelous success attained by so many, who have gone up from the humble walks of farm life to shine in the galaxy of greatness. In the very nature of things, the mind development and character development that come of farm life is such as may be conducive of and lead to a well-proportioned, fully rounded out manhood, and fit one for the highest type of citizenship. Moreover, human history points uniformly to the fact that the greatest measure of human happiness is found along these lines. The greatest men of earth—the statesman, the warrior, the financier—have looked wistfully to the peaceful retirement of rural life as the fitting emblem of a restful quiet of declining years. Webster, when old, shrunk from the excitement of forensic effort found in the halls of Congress, but sought the companionship of shrub and flower, and asked unto the last that his faithful oxen be brought near, that he might stroke their glossy coats with his hands. Thus in his closing days he communed with nature. Jefferson sought Monticello, and Washington Mount Vernon. The inspirations that had imbued their young lives upon the farm had lived on and on through all the varied excitements of public life, to be renewed and rekindled again in age. But not so with all. Some having quitted that vocation, the best on earth for the all-round development of the highest type of manhood, being allured by the glittering phosphorescence called "fame," have forged their way by accumulated force of character, to the top crest of the popular wave. It may be they enjoyed the plaudits of their fellows, and may have

> "Trod the paths of glory and
> Sounded all the depths and shoals of honor."

Yet this position, so full of apparent glory, fails to satisfy to the fulness all the wants and cravings of human existence.

Then again, how fickle and how versatile is human appreciation! The man who today is upborne by the plaudits of his fellows till his career is like a brilliant meteor blazing athwart the political firmament, may tomorrow sink, amid their curses, into obscurity and darkness. Warren Hastings, Burke and Sheridan of the old world, and Aaron Burr of the new, are samples.

It was said of one of the former, that, having followed the bubble fame, and devoted the best energies of his vigorous manhood in political service, the star of his glory had set prematurely. An aimless wanderer, unappreciated, he moved among his fellows. He came nearly to his journey's end. Cheerless and sick of heart, he retraced his steps. Coming to the place where once he had shone so brilliantly, where now there was none so poor as to do him homage, he said: "I come—an old man, broken by the storms of state—to lay my weary bones among ye. Give me a little earth for charity."

Others have gone out into restricted lines: worshippers of mammon; the all-consuming desire to make money—every other faculty shriveled and shrunken: the money-making, money-getting mania overshadowing and dwarfing every other development. Of such an one you ask, your purpose? To make money. After some years, success having crowned his efforts, you ask, what next? The reply comes quickly, make more money. Later you ask, what next? More money. And so on and on, this ruling passion, ruling stronger and stronger, till it becomes even strong in death. What next—golden streets? Nay, verily; he could not enjoy gold or wealth except to get it, to keep it, to hoard it, and unless his whole nature and being were changed, golden streets would have no charms for him.

Not so they who develop the wider range of God-given faculties, and nowhere may this be done more fully than in horticulture.

> "He that plants, plants youth,
> Vigor won for centuries, forsooth,
> Life of time that hints eternity.
> Boughs their strength uprear,
> New shoots every year
> On old growths appear.
> Thou shalt teach the ages, sturdy tree,
> Youth of soul is immortality."

The United States Supreme Court has made the following decision in a case brought before it involving the question whether the tomato is fruit or vegetable:

" Botanically speaking, tomatoes are the fruit of a vine, just as are cucumbers, squashes, beans and peas. But in the common language of the people, whether sellers or consumers of provisions, all these are vegetables which are grown in kitchen gardens, and which, whether, eaten cooked or raw, are, like potatoes, carrots, parsnips, turnips beets, cauliflower, cabbage, celery and lettuce, usually served at dinner, in, with or after the soup, fish or meats which constitute the principal part of the repast, and not like fruits generally, as desert."

A CHEAP INSECTICIDE.—Dr. Fisher, of Fitchburg, who is one of our most experienced horticulturists, says that one ounce of sulphate of copper dissolved in 100 gallons of water is simpler, better and cheaper than Bordeaux mixture for destroying fungi on apples and pears; and it may be made weaker for plums and peaches, or stronger for grapes and potatoes. For insects, Dr. Fisher adds an even teaspoonful of Paris green to each gallon of the mixture. For leaf-sucking insects, aphis, slugs, etc., he uses the kerosene emulsion.—American Cultivator.

Read This Before You Cast Your Vote.

I am a candidate, and expect to be elected, no matter how you cast your vote, to sell you the cheapest plants. I will sell you 300 strawberry plants, your choice of 75 varieties; 200 raspberry, your choice of 25 varieties; 200 blackberry, your choice of 28 varieties; 50 grape-vines, 50 plum-trees and 50 apple-trees, for the money you spend for tobacco in one year, provided you spend 25 cents a week. The yield of berries per acre in one year with proper culture and selection of varieties is as follows: Strawberries 300 bushels, rows 4 feet apart; set plants in rows 10 to 15 inches; will commence ripening middle of May and continue five weeks; raspberries 75 bushels, rows 7 feet apart, plants 2 feet apart; will commence ripening before the late sorts of strawberries are gone; blackberries 110 bushels, rows 8 feet, set plants in rows 12 to 15 inches apart; will commence ripening before late raspberries are gone. The Early Harvest has been ripe with me the 9th of June, with late strawberries. Plum-trees will bear the fourth year 125 bushel, per acre; plant 12 to 15 feet apart; the proper selections will ripen three months. Best time to set plants is early spring. Who will deprive themselves of fruit at the above prices in a county where berries have never been known to fail? The time has come that every enterprising land and lot owner will plant trees and vines. I will raise 2000 bushels of strawberries ready for picking at two cents per quart—the Bubach varieties, and the Kittatinny blackberry—the coming season. I expect the finest berries in Missouri, and the prettiest girls to pick them.

JACOB FAITH.

Two miles west of Montevallo.

Of Interest to Grape Growers.

[Published by request of the Publication committee of the Missouri Valley Horticultural Society.]

Cut this out and paste it in your scrap-book, as it is information not generally known, and of the greatest interest to growers of the vine. It is from the "Rural New Yorker:"

Question: I am planting a collection of grapes especially for exhibition purposes. I have about 100 varieties planted now, all of the oldest and best-known sorts. How many varieties are there, such as I can grow in Ohio? I don't understand the Rogers grape in full. Who is or was this Rogers, and how many varieties did he introduce, and who is Ricketts, and about his varieties? What is your opinion of the Gaertner (Rogers No. 14) grape, and will it do for me to plant for market?

Answer: E. S. Rogers, of Salem, Mass., is the man who may be considered the pioneer in American grape-crossing. He used native pollen upon foreign varieties, and vice versa, and the following are among the best of his varieties so produced: Nos. 2, 5, 8, 30, 1 (Goethe), 3 (Massasoit), 5 (Wilder), 9 (Lindley), 14 (Gaertner), 15 (Agawam), 19 (Merrimac), 28 (Requa), 39 (Amenia), 41 (Essex), 43 (Barry), 44 (Herbert), 53 (Salem). All his work was done in a little garden. His first hybrids fruited in 1856, and long afterward they were designated by number. James H. Ricketts, of Newburg, N. Y., beginning later, continued his work of crossing for 20 years. He produced many wonderful varieties, which time has shown are not adapted to general culture.

The great expectations entertained for years that these grapes, or some of them, would suit almost any locality, have been disappointed. With no great care of the vines, with a soil of but ordinary richness, Mr. Ricketts year after year raised his seedlings and exhibited them at many fairs, where they scarcely ever failed to carry off the first premium. But other people have never been able to do what Mr. Ricketts has done, and few of his grapes have more than a local reputation. The Gaertner is one of the showiest of Rogers' collection. The color is a light red, and the berries translucent almost to transparency. In many places it thrives, the vine being strong and productive; in other places the berry rots and is worthless.

INSECT ENEMIES—The worst 11 apple pests are: 1. Apple-root louse; 2, Round-headed borer; 3, Flat-headed borer; 4, Oyster-shell bark louse; 5, Spring canker-worm; 6, Lesser apple-leaf folder; 7, Leaf crumpler; 8, Leaf skeletonizer; 9, Apple-leaf hopper; 10, Apple-tree aphis (all of which are conspicuously injurious to young orchard trees and nursery stock); 11, Codling moth, which injures the fruit. 12, Pear-tree slug is the worst pear pest; 13, Plum gouger, and 14, Plum Curculio, the worst plum insects; 15, Peach-tree borer, the worst peach insect; 16, Grape phylloxera: 17, Grape-vine leaf-hopper; 18, Grape vine flea-beetle, and 19, Grape berry-moth, the worst grape insects; 20, Imported currant worm, the worst currant pest. And of the strawberry; 21, White grubs; 22, Crown borer; 23, Root worms (affecting the roots), and 24, Leaf-roller, and 25, Saw-fly (the foliage), the worst insects. Thinks fruit-growers as a rule will accomplish most by looking at insect depredations from a horticultural rather than entomological standpoint, by studying, first, the injury; then, if need be, the insect; and then the remedy, instead of the insect first, as entomologists.—Prof. S. A. Forbes, Champaign, in Prairie Farmer.

SECRET OF SUCCESS.—A very well-known horticulturist, when asked what was the secret of success in his business, said: "Keep the ground stirred." There is more in this than there would have been in a learned discussion that would have amounted to the same thing. A comparatively poor piece of ground will make a fair crop with good cultivation, but the most fertile will fail if weeds are allowed to possess the ground.—American Farmer.

Grafting the Wild Fruit-trees of America.

HARVEY, ILLS., Dec. 4, 1893.

J. C. EVANS:

DEAR SIR—I recollect of meeting you in the late World's Fair at Chicago. You handed me a card inviting me to attend your State Society meeting. I regret to inform you that it will be impossible for me to be there. However, I will send you a paper, title, "My Experience and Observations in Grafting the Wild Fruit-trees of America."

My attention has been lately called to an experiment made near this place, of a farmer having a woods pasture partly covered with wild Crab and Red Haw trees.

The Crab-trees, some 15 or 20 years ago, he grafted to the apple; the Red Haw he grafted to the pear; he grafted them so high up that the animals could not get at the fruit; he has apples and pears in abundance in years when there is any fruit in the neighborhood; his pears are of the old varieties, such as Bartlett, Flemish Beauty, etc.; they seem to be free from blight and winter-killing on the Red Haw.

At Rome, Peoria county, Illinois, L. Adams has been grafting the Early Richmond cherry on the Miner and Wild Goose plum stock. He says that they are hardier and bear better than on the cherry stock. I would advise all cherry-growers to use the Marianna plum stock, as it does not sprout at the root. The peach can be grafted or budded successfully on the wild native plum stock, and make it much hardier and more productive than on the peach root. Our wild native grapevines can be very easily grafted to our most approved varieties at a very trifling cost. Some 25 years ago we grafted a wild, worthless vine standing in the yard of George Burt, Harvey, Ill., to the Concord grape. It bore some the next year from grafting. For the last 20 years it has borne all the family could use, and some to give away to the neighbors; $100 would not buy it and have it removed.

The above experiments are sufficient to convince us that the grafting of the wild fruits of America is feasible and practicable. Those wishing to graft the wild crab to the apple, we would recommend that they use largely the scions and buds of the Duchess of Oldenburg, a

Russian variety well known all over our nation at this time. There was not an exhibit of apples in the late World's Fair but had it in their collection; it is as hardy as the wild crab; is of slow growth, and will not outgrow the wild crab stock and get top-heavy. The fruit is excellent for ordinary purposes; it is very early, can be cooked when one-half grown, and will last until October. In Northern Illinois, grafted on the wild crab it will keep one or two months later than on the apple stock.

If all the wild Crab-trees of our nation were converted into Duchess of Oldenburg, Yellow Transparent, Healthy, Famuse and other valuable varieties, it might be made worth more to us than the gold mines of California or the oil wells of Pennsylvania.

Those that wish to convert their Red Haw, known by some as wild thorn, to the old varieties of the pear, we would recommend as the hardiest and most productive the Flemish Beauty. Those wishing to graft the pear that has got the most money in it, we would recommend the Lincoln, a native seedling of Central Illinois, 57 years old, as hardy as an oak, and has borne annual crops for the last 50 years.

To all appearances, the Lincoln pear can be made worth as much or more than the Duchess, as it can be canned and made an article of export in great quantities. Those that wish to graft the wild plum to the cherry, we would recommend the Early Richmond and the English Morellow as they are both hardy, prolific bearers, and are good for canning and shipping to foreign nations.

Those that wish to graft the wild grape-vine we would recommend to use largely of the Concord, it being hardy and good enough for general purposes; when kept at the right temperature, it can be kept all winter.

The grape-vine can be grafted in the fall, all winter, or till fully out in the leaf; when fully out in leaf, the stock bleeds the least of any time.

For the last two years we have been experimenting in fall and winter grafting. In November, 1892, we grafted Lincoln pears that did well. In February, 1893, we grafted more; some of them grew four feet, as dry as the summer was. I use cotton cloth, boiled in ordinary grafting wax. A. H. GASTON.

Spraying for Peach Rot.

[The following results are deduced from the experiments made at the Delaware Experiment Station, by F. D. Chester, Newark, Delaware.]

(1) It has been shown positively that the principal source of infection in this disease exists in the decayed fruit which is permitted to remain on the trees after harvest. The labor of removing this infectious material may seem formidable, but I am convinced that no treatment will be effective without it, and I am equally convinced that the labor so spent will yield to the grower a return far greater than its cost.

I would therefore urge that no mummified fruit be allowed to hang onto the trees through the winter, but that it be removed either at the time of picking or soon after.

(2) Early in the spring, before the fruit buds begin to swell, spray the trees with a solution containing one pound of copper sulphate to 25 gallons of water.

(3) As soon as the fruit buds just begin to swell, spray the trees with the fungicide again. Follow this by another spraying before the buds open. The object of the preceding applications is to protect the blossoms from the blight mentioned in the account of the experiments.

(4) As soon as the fruit shall have reached full size and begins to show signs of color, make a third application. This should be followed by two or three other applications at close intervals of five or seven days during the ripening period.

It should be noted here, that a heavy rain followed by warm weather may at this vital period cause the peaches to rot rapidly; hence, due regard should be given this point in regulating the exact time when a spraying should be made. Due attention to this principle may save hundreds of baskets of fruit, and the grower can well afford to make spraying at the right time his first business.

Is the question asked, "Can peach rot be wiped out of our orchards, even in those containing the early rotting varieties? Can the work be made as effectual and complete as it has been in the case of grape rot at Mr. Anthony's (see Annual Report, 1891)?"

Were it not that positiveness of statement is unscientific, I should say that it can. Not by a single year's treatment, but by continued attention for several years to the rules just laid down. To demonstrate these points fully will demand further experiments, which are now being arranged for the coming season of 1893.

Thus it is seen that there are two periods of marked infection by the fungus, both concurrent with wet conditions and high temperature, the first during the third week in April when the blossoms blighted, and the second in the last week in June, when the fruit became attacked.

Peach Yellows and Rosette.

[The danger of peach yellows and rosette stares us in the face, and I feel inclined to submit the following from B. T. Galloway's report to the Secretary of Agriculture.]

PART I—PEACH YELLOWS.

(1) *Destructive Nature of Yellows.*—Peach yellows is a perplexing and destructive disease. On all hands it is conceded to be one of the most serious with which American fruit-growers have to contend. Formerly this disease was confined to a small district on the Atlantic coast, but during the last 20 years it has invaded distant regions hitherto free, and has entirely ruined the peach industry over very considerable areas. Within 10 years the disease has taken a fresh and very strong hold upon orchards in the Delaware and Chesapeake region, the north portion of the peninsula, and has destroyed thousands and thousands of trees, rendering a great industry unprofitable or precarious. It seems to be native to the eastern United States, having, so far as we know, not been reported from California. Diligent inquiry also has thus far failed to bring to light any notice of its occurrence in Europe or other parts of the globe.

The distribution of the disease and the losses occasioned thereby were set forth somewhat fully in my first bulletin, and do not concern us at this time. It is proper to state, however, that the losses continue in the infected districts; that the disease has appeared in new localities; and that regions now healthy are also threatened. The yellows is certainly as far south as Southern Virginia, and probably as far west as Arkansas and Northeastern Texas. Peach-growers are earnestly advised to stamp out the disease upon its first appearance, and are warned against the importation of trees from infected districts. These remarks apply with especial force to the Pacific coast, and in this connection it is well to remember that the apricot and almond are also subject to yellows. It would be much safer for the Californians to grow their own peach-trees than to introduce any from the Eastern United States.

If trees are imported, it should be known beyond question that they are from regions where this disease does not occur. The mere fact that the nursery stock is healthy at the date of shipment is not a sufficient guaranty that it will continue so.

(2) *Characteristics of the Disease.*—The primary and peculiar symptoms of peach yellows are only two: (1) The red spotting and abnormally early maturity of the fruit; and (2) the premature germination of ordinary winter buds or of obscure buds buried in the bark of the trunk and limbs or formed in the cambium. All other symptoms result from these, or are only the common indications of disease and decay in plants.

High-colored, premature fruits are one of the conspicuous symptoms of the disease, and are easily distinguishable. In July, 1891, I saw hundreds of bushels of this worthless fruit in upper Maryland and Delaware, and the entire loss thereby in 1891 certainly exceeded half a million dollars.

Gradually or simultaneously, as the case may be, all of the limbs develop the same symptons. Consequently, the tree falls into a decline and finally dies. Trees once attacked rarely, if ever, recover. This statement is still in dispute, but I feel quite sure. Hundreds of yellowed and decaying orchards on the upper part of the Chesapeake and Delaware peninsula bear witness every day to the truth of this assertion· In a very few instances I have had trees pointed out to me as once diseased and now recovered, but no such cases have ever come under my own observation.

The duration of the disease varies greatly. If the symptoms progress slowly from limb to limb, the tree may live a long time. If the whole tree is speedily involved, decay and death are correspondingly rapid. I have known trees to die at the end of the first season, but such is not usually the case. In Maryland and Delaware, as well as in regions farther north, the affected trees generally live from two to five years, and possibly longer in some cases. Incidentally I am keeping watch of several hundred trees to determine this point more accurately. The trees are worthless from the start and should be removed as soon as the disease appears. If allowed to remain, complete death occurs, very frequently, the third or fourth year, the last feeble sign of vitality being a few yellowish tufts on the trunk or some of the limbs.

FACTS ESTABLISHED.

(1) The disease is contagious. It seems to me that experiments 1, 2 and 5 settle this point beyond dispute.

(2) It may be conveyed by seemingly healthy buds when these are taken from diseased trees. This is proved by experiments 2 and 5.

(3) Only a very small amount of infective material is necessary, provided it be in the forms of living cells, which can be induced to unite with the actively growing tissues of the tree.

(4) The disease has a longer period of incubation than we have been accustomed to suppose.

(5) The death of the entire tree occurs, ordinarily, only after a very considerable period, *i. e.,* several years.

HYPOTHESES RENDERED PROBABLE.

(1) The whole tree is affected when symptoms appear in any part of it.

(2) In some cases, perhaps many, the period of incubation—*i. e.*, the time between the insertion of a diseased bud and the appearance of the disease—is longer than any yet clearly established.

(3) The disease is also communicated to budded trees in some other way than by bud inoculation. This is probable in case of many young trees, and is almost certain in case of old trees.

(4) The trees are not infected through the blossoms. This is inferred from the result of the excisions, and from the fact that, in some cases, the disease appears to develop between fall and spring, and to stimulate the blossoms themselves to an unnaturally early development.

(5) Since diseased trees have been shown to be very full of infectious matter, it must be that, for unknown reasons, much of this fails to find an immediate entrance into healthy trees. Otherwise, the peach would soon disappear entirely.

ERWIN F. SMITH.

PART II—PEACH ROSETTE.

The second part of this report will be devoted to a peculiar disease prevalent in Georgia, and first referred to as probably a southern variety of peach yellows,* but since described under the name of the Peach Rosette.†

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*Peach yellow: A Preliminary report. U. S. Dep. Ag., 1888.

†The Journal of Mycology, Vol. 6, No. IV.

The disease does not appear to be due to any ordinary fungus, or to insects. In some respects it is quite like peach yellows, but in others it differs very materially. This year additional observations have confirmed the belief that it is a disease distinct from yellows, and I shall so consider it until proof to the contrary is forthcoming.

(1) *Plants attacked.*—As stated elsewhere (*l. c.*), the Rosette attacks many varieties of peaches. None appear to be exempt. It occurs in budded fruits and seedling. The latter do not escape even when growing in fields and thickets without cultivation. This disease is not confined, however, to the peach, but also occurs in plums—budded trees and seedlings, cultivated, uncultivated and wild, and is equally destructive. I have not seen it in varieties of *Prunus domestica* or in the Mariana, but it occurs in the wild *Prunus Chicasa*, in the Cumberland and Wild Goose, and also in the Japanese varieties known as Kelsey and Botan. Probably the disease is capable of attacking many other sorts, and requires only a suitable opportunity.

This year in an orchard near Griffin, Georgia, which I know to have been nearly free from disease in 1890, and quite thrifty and well cared for, I counted about 40 bad cases of rosette, divided nearly equally between Kelsey and Botan. These trees were five or six years old, and the loss must have been considerable.

(2) *Characteristics of the disease.*—As in peach yellows, this disease not infrequently attacks one or two branches only at first, but in a much larger per cent of cases the whole tree is diseased from the start, and the disease runs its course in a much shorter time. Six months is usually sufficient to destroy a tree, and I have known no cases to last more than two seasons. Such a thing as the lingering on of a diseased tree from year to year, as in peach yellows, is not known. I have seen trees completely diseased in June and dead in November, which first showed symptoms in early spring, and were in apparently perfect health the preceding autumn. This is the common course of the disease.

When a tree is attacked in part, the shoot-axes and foliage of the remaining limbs often appear to be perfectly healthy, but these limbs always develop rosettes, and die the following year. Not infrequently I have observed the disease to progress gradually from the affected side to the healthy—*i. e.*, the parts on the healthy side first to be attacked being the bases of the limbs. The bark of trunk and limbs on affected trees presents no peculiar or symptomatic differences. Undoubtedly there are changes in the cambium cylinder corresponding to the shortening of the terminal shoot-axes, but these are not visible externally.

The following are some of the more noticeable symptoms:

(a) Young shoot-axes.—Commonly the disease first appears in the unfolding shoot-axes: *i. e.*, in early spring when the buds first open. In healthy trees only a small proportion of the winter buds develop into branches. The rest die or remain dormant. In this disease a very large part of the winter buds grow into shoot-axes, and also a very considerable number of dormant buds on the older and larger branches.

In diseased trees, the shoot-axes push only 1 to 3 inches; lose almost completely the ability to develop and ripen wood, and to form dormant buds. The buds on such shoots grow as soon as they are formed, or rather, as soon as they receive the initial differentiation, developing into diminutive soft branches, which frequently branch again, but never attain any good degree of size, vigor or maturity.

(b) The foliage.—The leaves on these dwarfed branching shoot-axes are multiplied correspondingly, and the result is compact tufts or rosettes containing 200 to 400 diminutive leaves, and many additional green stipules, which are frequently misshapen and abnormal. The older and larger leaves near the base of the shoot frequently reach a length of several inches, and are characterized by a very pronounced inrolling of the margins of the leaf, and by a certain stiffness due to a peculiar straightening of the midrib. These leaves turn yellow in early summer and fall very readily.

Trees attacked by rosette generally drop their fruit early, and while it is still green or yellowish green. In June, 1891, I saw scattering fruits on many diseased trees, and none of them were premature or bore any of the characteristic symptoms of peach yellows. The fruit, even on badly affected limbs, when there was any at all, was small, green, or yellowish green, and often more or less shriveled.

This disease, or one very much like it, also occurs in Kansas. It appeared at Manhattan in 1889, and is now quite prevalent in that locality, but has not been reported from other parts of that State.

The disease is very destructive in both states. Mr. T. C. Wells, of Manhattan, Kansas, lost his entire orchard in two years. Mr. R. C. Fryer, of Shiloh, Georgia, has lost several orchards, each in a space of about three years. In other parts of Georgia the disease has progressed less rapidly, but no less surely. About Griffin, Georgia, the seedling-peach orchards and the wild plums have suffered most, but the disease has been in the budded orchards for some time, and is gaining ground every year. Next to peach yellows, I regard it as the most dangerous enemy to peach culture in the United States. In some respects it is worse than yellows, because it runs its course more speedily and is more apt to take the entire tree from the start. Should it become as prevalent in Kansas and Georgia as yellows now is in north Maryland and Delaware, profitable peach-growing will be entirely out of the question.

CONCLUSIONS.

(1) The rosette, as now understood, differs from peach yellows in the following particulars:

(*a*) The more tufted character and somewhat different appearance of the diseased growths.

(*b*) The much greater tendency of these compactly tufted growths to develop in early spring from winter buds, and to appear all over the tree.

(*c*) A less tendency to develop sprouts upon the trunk and main limbs.

(*d*) The absence of premature fruit.

(*e*) The general early fall of leaves and fruit on affected trees, the fruit being small, yellowish green, and more or less shriveled and gummy.

(*f*) Gummosis of the roots.

(*g*) The occurrence of the disease in plums.

(*h*) The much more speedy destruction of affected trees.

(2) The disease is virulently contagious (Experiment 1), and it is probable that something might be done toward checking its increase by the prompt destruction of all affected trees. This should be done in early spring, as soon as the disease appears and before the leaves begin to fall.

(3) The disease may exist for a short time in part of a tree without being in the rest of it (Experiment 2), but it soon involves the entire tree. In other words, it would seem from Experiment 2 that the cause of the disease must enter the tree at some particular point or points, and be carried gradually to all parts through the circulation. A comparison of the November and June examinations in Experiment 1 also confirms this belief.

(4) As in peach yellows, the admitted fact that neighboring trees are not always the next to take the disease is no argument against its communicable nature.

(5) This disease has gained a strong foothold, and is on the increase, especially in that part of Georgia known geologically as the Archæan.

(6) If Georgia peach-growers would save their orchards and maintain the successful cultivation of the peach, the necessity for prompt and concerted action appears to be very great.

Fruits at Woodbanks.

NUT-GROWING.

When, almost a decade ago, I began to aid in booming nut culture, it was in the firm conviction that it held out greater promises of financial success than did most of the other branches of horticulture. This opinion, however, was not backed by much practical experience, and soon I began to recognize that planters would have to go very slow in order to avoid sad disappointments. In the years of experiment and observation following, the disappointments have not failed to come. Pecan trees grown from choice nuts grew too slow for my impatience, and I gave them up in despair as unsuited to our northern climate. English walnuts, grown from nuts gathered by myself in New Jersey, made better growth, but seem to require a long time, and a favorable location at the north, to bring them into fruiting. Even a specimen of the early-bearing variety *(Juglans regia præparturiens)*, the only one under my observation, although of bearing age and size, and producing fruit blossoms in abundance, failed to set fruit for lack of pollen. Filberts have grown into good-sized bushes, but have not yet given us a single nut, or even blossom.

The Japanese Giant chestnut has shown itself as variable as any other seedling fruit. Its boasted prolificacy is not a uniform characteristic of the race, and the quality of the nut is less satisfactory even than that of the Spanish chestnut of our fruit-stands. Judgment over all these kinds of nuts has to be held in suspense for a while.

But the Paragon chestnut on our grounds, and wherever else I have met it, has brought us a revelation. I think it justifies all the claims ever made for it. I know of no kind of fruit of which I would plant an orchard with greater faith in a satisfactory outcome than this chestnut, and surely I would want a specimen tree or two on the home grounds. The tree at Woodbanks appeared with branches bent down under its burden of fruit early in October, and a basket of the freshly-gathered nuts. The tree was planted in the spring of 1889, and has had ordinary good care. In 1892 it bore about a pint of nuts, which ripened just in advance of the first severe night-frosts. This last season the little tree again carried all the fruit it was able to hold without breaking the limbs. We gather the crop about the middle of October, a few days before the first killing frosts, the nuts then being ripe and most of the burrs partially open. Each of the 32 burrs contained from 2 to 6 perfect nuts, and altogether the 96 nuts measured nearly 3 pints.

While the specimens almost equal the imported Spanish chestnut in size, varying from 1¼ to 1¾ inches in largest diameter, their quality is far superior, and almost equals that of the best American Sweet chestnuts. The uniform tenor of all my reports about the behavior of the Paragon elsewhere justifies the expectation that our trees will bear quickly-increasing crops from year to year, and the earnest advice to every owner of a rural home to plant at least a tree or two of this chestnut. It is a pleasure to have it on the grounds. And if you want to know what a tree of bearing age, even if yet young and small, is worth, ask the children what they would take for the tree to have it removed from the premises.

Louisiana Products in Missouri.

During the week ending December 8, inst., L. L. Seiler, of Lake Charles, attended the annual meeting of the Missouri State Horticultural Society, held at Fulton, Missouri. From here he took quinces weighing two pounds each, three varieties of oranges, three of Japan persimmons, two of figs—one on the branch, the other in jars preserved and pickled—and rice in the sheaf. Prof. Stubbs had sent from the experiment stations the finest collection of sugar-cane ever brought together. There were about 50 varieties, all nicely labeled and named. Many of the canes were of enormous size, and the coloring was something of artistic beauty. In addition to the sugar-cane the Professor had sent Japan beans with pods a foot or more long and 2 inches wide, jute stalks 12 feet long, ramie stalks 3 feet long, teasinte stalks 18 feet long, an indigo plant that emulated the size of the scriptural mustard; Para grass 10 feet long; fresh alfalfa and several other varieties of forage plants.

This Louisiana collection made a most favorable impression on our northern neighbors. The hard limits of time alone put an end to their questions concerning this country. The oranges were sampled by the commissioners of the Society, and as is universal, classed with the best. At the close of the convention, every one who could carried home a souvenir in the form of a sugar-cane, head of rice or other article; and as an expression of good-will and desire for reciprocity, the Society filled a box with some of their show apples, and requested Mr. Seiler to put them on exhibition in Lake Charles. They say: "We want your winter vegetables, early strawberries, grapes, pears, oranges, rice, sugar and lumber. You want our corn, pork, flour, Irish potatoes, fall grapes and apples. Let us trade." We answer with a hearty amen.—Lake Charles American.

Fruits.

[Food and Medicine.]

It is a mistaken idea that no fruit should be eaten at breakfast. It would be better if people would eat less bacon and grease at breakfast, and more fruit. In the morning there is an acid state of the secretions, and nothing is so well calculated to correct this as cooling, sub-acid fruits, such as peaches, apples and pears. Most of us have been taught that eating fruit before breakfast is highly injurious. How the idea originated I do not know, but it is contrary to both reason and facts.

The apple is one of the best of fruits. Baked or stewed apples will generally agree with the most delicate stomach, and are an excellent medicine in many kinds of sickness. Green or half-ripe apples stewed and sweetened are pleasant to the taste, cooling, nourishing and laxative, far superior in many cases to the abominable doses of salts and oil usually given in fever and other diseases.

Oranges are very acceptable in most stomachs, having all the advantages of the acid alluded to, but the orange juice alone should be taken, rejecting the pulp.

The same may be said of lemons, pomegranates, and all that class. Lemonade is the very drink in fevers, and when thickened with sugar is better than syrup of squills and other nauseous drugs in many cases of coughs.

Tomatoes act on the liver and bowels, and are much more pleasant and safe than blue-mass or liver regulators. The juice alone should be used, rejecting the skin.

The smalls-eeded fruits, such as blackberries, figs, raspberries, currants and strawberries, may be classed among the best foods and medicines. The sugar in them is nutritious, the acid is cooling and purifying, and the seeds are laxative.

The True Value of Green Manuring.

By Prof. Julius Kuhn, Director of the Agricultural Institute, Halle, Germany.

[Translated and condensed by E. W. Allen, Ph. D.]

The practice of green manuring as a means of improving the fertility of the soil is one of the oldest in agriculture. It was advocated by Roman writers more than 2000 years ago, and from then till now lupine especially has been widely used for this purpose in southern

France and Italy. Recently it has received a new impetus from discoveries made in plant nutrition, and is being vigorously advocated far and wide by writers on agricultural topics, without proper regard for the conditions under which it must prove an irrational practice.

The ancients knew that leguminous plants, especially the clovers, left the soil richer after their growth, even when the crop growing above ground was harvested, and they also knew that the soil was enriched in proportion to the size of the crop. Emil John found by a series of analyses more than 40 years ago that this added richness did not consist alone in an increase in the humus-forming materials of the soil, but in an actual increase in the nitrogenous matter of the soil. The reason for all this, however, was not apparent until a few years ago. Investigations by Hellriegel, the director of a German experiment station, demonstrated the fact that leguminous plants have the ability to take up or assimilate the free nitrogen of the air and use it in their growth, and that they are enabled to do this by numerons tubercles or nodules which grow on their roots. The tubercles had been noticed before, but their function was unknown. Just how this assimilation of free nitrogen is affected is a problem not fully solved. Further studies have shown that the tubercles contain large numbers of microbes or micro-organisms, which appear to be responsible for the assimilation of nitrogen. It appears to be a result of their life processes. They live in a sort of partnership with the plants, deriving certain things essential to their life and growth from the juices of the plant, and in turn furnishing the plant with nitrogen. This partnership is known in science as symbiosis. Much remains to be found out regarding this mysterious process, and it must be admitted that there is a certain amount of speculation in this theory. The question is an exceedingly difficult one to get at. But it is sufficient for practical purposes to know that leguminous plants provided with these tubercles possess a nitrogen source not available to other kinds of plants.

These discoveries throw a new light on green manuring and on the plants best adapted for green manuring. They show that while both leguminous and non-leguminous plants enriched the soil alike in humus-forming materials, in proportion to the size of the crop. they differ in respect to the source of their nitrogenous materials. While non-leguminous plants derive their nitrogen supply almost exclusively from the soil, leguminous plants take theirs from the free nitrogen of the air. Consequently, if spurry, rape, mustard, etc. (non-leguminous plants), are grown on the soil and the crop plouwed in, the soil is not materially enriched in nitrogen ; the process is simply returning to the soil all the nitrogen which the crop took from it. Probably a very slight increase in nitrogen would occur, for it has been shown that all plants are able to absorb the traces of carbonate of ammonia in the air. But since leguminous plants may derive the large proportion of their nitrogen from without the soil—that is, from the air—their use for green manuring actually enriches the soil in nitrogenous matter; and, as a matter of fact, this is true in a high degree. This advantage of leguminous plants over other plants for green manuring increases the poorer the soil is naturally, and the less its ability to absorb the ammonia of the air. Leguminous plants which are adapted to grow on such poor soils and produce a large crop of green material are exceptionally valuable. The lupines possess these qualities in a high degree. Thus it is that the preference for this plant for green manuring, which has existed for more than two thousand years, is today fully explained and accounted for.

FORESTRY.

A TREELESS COUNTRY.

"I had a dream which was not all a dream!"
A great State was a desert, and the land
Lay bare and lifeless under sun and storm,
Treeless and shelterless. Spring came and went,
And came, but brought no joy; but in its stead
The desolation of the ravine floods
That leaped like wolves or wildcats from the hills,
And spread destruction over fruitful farms,
Devouring as they went the works of man,
And sweeping southward nature's kindly soil
To choke the water-courses, worse than waste.

The forest trees that in the olden time—
The people's glory and the poet's pride—
Tempered the air and guarded well the earth,
And under spreading boughs for ages kept
Great reservoirs to hold the snow and rain,
From which the moisture through the teeming year
Flowed equably but freely—all were gone—
Their priceless holes exchanged for petty cash.
The cash had melted, and had left no sign;
The logger and the lumberman were dead;
The axe had rusted out for lack of use;
But all the endless evil they had done
Was manifest upon the desert waste.

Dead springs no longer sparkled in the sun;
Lost and forgotten brooks no longer laughed;
Deserted mills mourned all their moveless wheels;
The snow no longer covered as with wool

Mountain and plain, but buried starving flocks
In Arctic drifts; in rivers and canals
The vessels rotted idly on the mud,
Until the spring floods buried all their bones;
Great cities that had thriven wondrously
Before the source of thrift was swept away,
Faded and perished, as a plant will die
With water banished from its roots and leaves;
And men sat starving in the treeless waste,
Beside their fruitless farms and empty marts,
And wondered at the ways of Providence!

—N. Y. Sun.

APPOINTMENT OF JOHN LIPSCOMB TO THE SHAW SCHOLARSHIP.

St. Louis, Mo., March 14, 1894.

Dear Mr. Goodman—I take pleasure in notifying you that the scholarship of the Missouri Horticultural Society has been awarded to a Missouri boy, John Lipscomb, of Peirce City, who earned it in competition with others, one of whom was from a point outside of the State. He will, therefore, figure as the nominee of the State Society. I am very much obliged to you for allowing these boys to compete for the scholarship, for I think that it has resulted in giving the appointment to a better person than might otherwise havve been the case, since he has been obliged to earn it.

Very truly yours,

Wm. Trelease.

Mr. L. A. Goodman, Westport, Mo.

Our Reports in England.

Patent Office Library, 25 Southampton Buildings,
Chancery Lane, London, Mar. 5, 1894.

L. A. Goodman, Esq., Secretary Missouri Horticultural Society, Westport, Mo., U. S. A.:

Dear Sir—My attention has been called by readers frequenting this library to the fact that the "Annual Reports" issued by your Society contain from time to time information that would prove of very great value for reference to many here. I am, therefore, induced to apply, and shall esteem it a favor if you will be kind enough to bring my application before the committee of the Society, asking that they will be pleased to cause copies of these reports, as far as issued and available, to be donated to this library, to be placed on our shelves for future reference.

This is, I may add, a Free Public Library devoted entirely to patents and scientific literature, being visited by over 400 readers daily.

I am yours faithfully,
HERBT. JNO. ALLISON, Librarian.

Arbor Day

Should not be a spasmodic effort at the planting of trees or of ornamenting our yards, lawns, school-grounds or parks, but should simply be the outgrowth or the outward expression of a desire to beautify our surroundings, and the result of the year's thought.

Arbor day was instituted by the present Commissioner of Agriculture, J. Sterling Morton, of Nebraska, 1874, and was continued the next year by enactment of the Legislature.

The year following, Kansas and Minnesota observed the day also. Now some 26 states observe the day, and it is continuing to spread over our land until we hope it will be a day of national importance.

The first requisite of successful Arbor days and the results to follow from it, is an intelligent knowledge of tree growth, and *how to plant* and grow the trees after planting.

While the final result cannot be anything but good, yet it could be a hundred-fold better if we could instill into the minds of those planting, that care and common sense is necessary to the successful planting. It is well to teach that the roots are the parts that grow in the ground, and are as necessary to the life of the tree as are the mouths of animals.

We want them to learn that the roots should not be exposed to the air any longer than is absolutely necessary, that every moment of exposure is that much loss of vitality ; that the roots need protection every moment from the sun and air to make a successful growth ; that the roots are more important than the top, and should be just as large and long as can be obtained ; that the roots will make the top, but that the top can make the roots only as the roots respond to their call for moisture and food.

The second lesson is intimated in the last expression. Some trees, especially the hard-wood trees, should be cut back just as little as possible to maintain the equilibrium of root and top. In all trees like the oak, hard maple, chestnut, birch, etc., they should have quite an abundance of the last year's growth, so that the buds will start easily in the spring. The leaves being the lungs and the pumping machines of the tree, they are as necessary to the good growth of the tree as the root; in fact, the roots cannot grow long unless the leaves respond to the call of the roots for air, and food from the air. Hence you readily see the necessity of having good strong buds and young twigs on the trees to assist the tree in its real work. Other trees, like the apple, the elm, the maple and the box-elder, and even the poplars, need this care exercised in the pruning of the tops of the trees just as well. While they will recover more quickly and easily, yet it is a great mistake to cut off every young twig on our trees so that all new growth may start.

How many of us have seen street trees standing like hoop-poles, without a twig or small branch even upon them, and standing thus for perhaps two or maybe three years before any headway is made in real tree growth, often never making a particle of growth until the second year, and then the body sun-scalded and the flat-head borer taking possession. Better by far plant a small tree that will always look well, and one that will please you to see grow, than such trees as we often see planted along our streets.

Another great, very great, mistake is in thinking that trees are not beautiful until they become large. No greater mistake can be made. There is just as much beauty, and sometimes I think more too, in the small, shapely, thrifty, vigorous-growing tree, be it apple, pear, peach, maple, elm, evergreen or shrub, than there is in the full-grown specimens. To a lover of trees, their beauty and the pleasure they give is a continual one; from the first of spring, the middle of summer, the autumn or the winter, all have their attractions.

But, taking Arbor day, what can we best do to make it a valuable one? I think perhaps more good can be accomplished in our schoolhouses than in any other way. But in this I believe that we should teach something of the life and growth of a tree and plant, and how properly to plant, as well as of planting.

It is comical to note the supreme ignorance of so many of our people, of the first principles of tree-planting. Some will plant a foot deep; some, though few, too shallow; some will not dig the hole large enough; some will cover roots with hard clods of clay, never thinking of nice, loose soil to cover the tender roots; some will take the tree and lay it down in the sun and wind while they are digging the hole: some will never cut a twig off the top; some will cut off all the top; some will never tramp the soil about the roots; some will never think of putting soil down under the roots; some will throw all the dirt on the roots and tramp them, so that, no soil being under the roots, as he tramps he breaks all the small roots off from the trees.

Some even think they must put manure and fresh stable manure in the holes when planting. These are some of the mistakes in planting that have come under my observation.

Carefully digging the trees, with all the roots possible; slightly pruning the tops so as to correspond to the roots, especially in hard-wood trees; protecting the trees while out of the ground with damp straw or damp cloths; digging the holes large enough to hold the roots without cramping; putting some of the fine top-soil in the bottom of the hole; placing the tree upon this and putting the top-soil over the roots sufficiently to cover the roots; tramping well the soil about the roots, being careful not to break any of them by tramping; planting the tree only about two inches deeper than it stood in the nursery; selecting trees that have been grown in the nursery, if possible; putting water about the tree after the hole is half filled up and well tramped; filling up the hole with the rest of the dirt, leaving the ground about the tree in the shape of a saucer, so that it will catch the water, and finally mulching the tree with coarse stable manure or rotten straw, and you will have the work well done.

Trees, forests and plants are the pride of our nation, and every one looks with feelings of patriotism upon some of our historic trees.

The Elm tree at Philadelphia, at which William Penn made his treaty with the 19 tribes of Indians. The Sycamore that Alice and Phœbe Cary planted at Mt. Pleasant, Ohio. The Charter Oak at Hartford, which preserved the written guarantee of the liberty of the Connecticut colony. The Oak of Flushing, L. I., under which George Fox preached; the Cypress tree in the Dismal swamp, under which Washington reposed one night; the huge French Apple-tree near Ft. Wayne, Ind., where Little Turtle, the great Miami chief, gathered his warriors; the Elm tree at Cambridge, in the shade of which Washington first took command of the Continental army, on a hot summer day; the Tulip tree on King's Mountain, S. C., on which ten blood-thirsty Tories were hung at one time; the Pine tree at Ft. Edward, N. Y., under which the beautiful Jane McCrea was slain; the Black Walnut near Haverstraw on the Hudson, at which General Wayne mustered his forces at midnight, before his successful attack on Stony Point; the grand Magnolia tree near Charleston, S. C., under which Gen. Lincoln held the council of war before surrendering the city; the great Pecan tree at Villere's plantation, below New Orleans, under which a portion of the remains of General Packenham was buried; the great Pear trees planted by

Governor Endicott, of Massachusetts, and Governor Stuyvesant, of New York, more than 200 years ago.

I have thus given the list of historic trees, because we love to reverence these old land-marks in our history. Our State now observes this day, and the State Superintendent issues a circular calling the attention of the schools to the matter making the day a half holiday for our schools. The Missouri State Horticultural Society has also been accustomed to calling upon all its members and local societies to keep this day in planting trees.

Next to our orchard-planting, the ornamenting of our grounds is the most important matter to engage the attention of our societies.

"He who plants a tree,
  Plants a hope,
Canst thou prophesy, thou little tree,
What the glories of thy boughs shall be?" LUCY LARCOM.

As the leaves of the tree are said to absorb all noxious qualities of the air, and to breathe forth a purer atmosphere, so it seems to me as if they draw from us all sordid and angry passions and breathe forth peace and philanthropy.—WASHINGTON IRVING.

The trees may outlive the memory of more than one of those in whose honor they were planted. I have written many verses, but the best poems I have produced are the trees I planted on the hillside. Nature finds rhymes for them in the recurring measures of the seasons.—O. W. HOLMES.

Kind hearts are the gardens,
  Kind thoughts are the roots,
Kind words are the blossoms,
  Kind deeds are the fruits.
He who plants a tree
  Plants a love,
Heaven and earth help him who plants a tree,
And his work its own reward will be. LUCY LARCOM.

It is better to know the habits of one plant than the names of a thousand, and wiser to be happily familiar with those that grow in the nearest field, than arduously cognizant of all that plume the isles of the Pacific, or illumine the Mountains of the Moon.—RUSKIN.

Day after day, year after year,
Little by little the leaves appear,
And the slender branches spread far and wide,
Till the mighty oak is the forest's pride.

Arbor day planting should embrace trees for specific objects, causing them to be remembered in after years by those who plant them. One for some prominent man in the community, or the teacher or the school board, or the Governor or the President, or some great writer.

The best varieties for planting are:

Evergreens.—Red Cedar, Arbor Vitæ, Norway Spruce, White Pine, Scotch Pine, White Spruce.

Forest and Ornamental Trees.—Elm, Hard Maple, Tulip, Linden, White Ash, Birch, Norway Maple, Soft Maple, Box Elder.

Hardy Shrubs.—Lilacs, Spireas, Hydrangea, Weigelia, Snowball, Syringa, Althea, Purple Fringe, Dogwood.

Hardy Climbers.—Am. Ivy, Bitter-sweet, Honeysuckle, Trumpet Creeper, Wisteria, Clematis.

Herbaceous Plants.—Hardy Peonies, Hollyhocks, Deutzia, Dyaletria, Phlox, Dianthus.

Roses.—Hardy, Gen. Jacqueminot, Gen. Washington, John Hopper, La Reine, Mad. Chas Wood, Paul Neron, Mad. Plauties (June rose)

SET OUT TREES.

Set out trees! adorn the homestead;
Make it pleasant all around,
Let the elms, and oaks and maples,
With the evergreens abound;
Let the home be so attractive
That the boy that is today,
When he shall arrive at manhood
And in foreign lands will stray,
May turn with longing heart and loving
To his home these hills among,
Thinking how the trees are thriving
Which he helped to plant when young.

Set out trees! Upon the common,
Ashes, linden, poplars, birch,
Set them out around the school-house,
Plant them thick about the church;
Have the children's play-ground shaded,
And the public walks as well,
And the joys from these arising,
Coming ages glad will tell.
These shall live, and grow, and gladden,
While we moulder 'neath their leaves;
Let us then improve the present,
Leave behind us priceless trees.

—MRS. ANNIE G. MARSHALL.

The book for every farmer's boy to read is the open book of nature. There was none ever written that contains one-half of the information, none other half so fascinating, none so perfect and pure. Nature teaches us to dwell as much as possible upon the beautiful and good, and to ignore at all times the evil and the false.

Let us take a single tree for an object-lesson, and see what it will teach us. Time will not permit of our discussing the phenomena of plant life, and we will only say that vegetable and animal lives in no way differ in principle: there is a perfect analogy between the two. But in order to show you the pleasure that is to be derived from the study of the tree, we would say that all plants possess a real life: they eat, drink, feel and think; they sleep, breathe and secrete—in short, perform all the functions of supply, repair, development and reproduction. The intelligence they manifest in searching for food is simply wonderful, while the actions of climbing plants in search of supports are equally strange. All these wonderful peculiarities of plants are but little seen or appreciated. In fact, not one man in ten ever saw the true roots of a tree, or knows that they are put forth in spring simultaneously with the leaves and are shed with them in autumn.

To make the farm attractive, show the child its attractions: how plants know when there has been a store-house of food placed within their reach, and will immediately turn their attention to it. Show how each and every plant takes from the earth and atmosphere different elementary substances, and how they are stored up for our use. Show the child the plants' adaptation to the necessities of other living organisms in the localities where they are indigenous; how that in every locality the animal and plant support and sustain each other, and in the end consume each other. The breath of the ox is the food of the plant upon which he fattens.

How interesting it is to watch the plant industries as they are carried on side by side, each doing its own work wisely and well, and without exciting in the least the envy of its neighbor, and without contention or strife. We see the maple collecting saccharine juices; the pine, rosin; the poppy, opium; the oak, tannin, and so on through the list. In our gardens the aconite collects a deadly poison which it stores up in its tubers, and by its side the potato gathers in starch for the sustenance of man. The plant's adaptation to the soil and climate in which it is to grow is one of the most beautiful and useful studies for the old as well as the young. C. L. ALLEN.

I could write such a beautiful poem
  About this summer day,
If my pen could catch the beauty
  On every leaf and spray,
And the music all about me
  Of brook and breeze and birds—
But the greatest poet living
  Cannot put them into words.

If I only could write the color
  Of the lilac's tossing plumes,
And make you feel, in a sentence,
  The spell of its sweet perfumes;
If my pen could paint the glory
  Of the blue and tender sky,
And the peace that crowns the mountains,
  My poem would never die!

EBEN E. REXFORD.

While trav'ling o'er the prairies wide,
We see along the highway side
Poor beggars ranged; though not a word
They utter, yet our hearts are stirred
With tales they tell; in mute despair
They lift their shattered arms in air,
And tell of ills which they have known,
Of scathing blasts so often blown;
Of piercing cold, of dearth and flood,
Which chill, or dry, or taint, their blood.
Their mangled trunks and broken limbs
A sight present which well-nigh dims
Our eyes with sympathetic tears;
For sweet Pomona, many years
Hath nurtured with unsparing hand
These once fair products of the land,
Which now stand stark and almost bare
Of the rich dress they used to wear.
The luscious fruit they yearly bore,
Is found not now as 'twas of yore.
"Now listen to our final call;
We speak to farmers, one and all,
In these terse, emphatic words:
Plant evergreens to shield your herds,
Your orchards and your homes from cold;
These beauteous trees outweigh your gold,
Enhance your pleasures every year,
And when the close of life draws near,
Your children's gratitude will fill
Your hearts with the prophetic 'Peace, good will.'"—A. M. N

But perhaps my paper, already too long, may fail of its end if we leave out of our minds the great moving power behind all this planting. The love of the horticulturist for this continual planting has been the moving power in all this work, and we find their hand-marks on all sids; in our nurseries, our gardens, our yards, our orchards, our streets, our parks, our public grounds, our school-yards, and, as this power of the horticulturist grows, so we will see our Arbor day plantings grow. All honor, then, to the lover of tree-growth and tree-planting, the true horticulturist. L. A. GOODMAN.

Course of Study.

OBSERVATION.

Within comparatively recent times, the civilized states of the world, following in rapid succession, have inaugurated great educational systems at enormous cost. Never before in the history of the world did education occupy so large a place in the minds and hearts of the people. In view of this unprecedented interest and enormous expenditure, it is fitting seriously to inquire the end to be compassed through these educational systems. Education should seek to give the learner the completest mastery of his environment—the most familiar acquaintance with nature and man, through observation and books, and the ability to communicate the knowledge thus acquired to his fellow-man. Not that acquaintance with nature (almost universal the world over), which consists of a memory gorged upon the uninteresting facts and involved nomenclature of the books of natural science, but that acquaintance with nature (beginning at the cradle and ending at the grave) that enables the possessor to chain nature's forces to the chariot wheels of man's legitimate wants, and, in love and admiration, to look through nature to nature's God. Instruction in nature in the secondary institutions of learning in this country may be aptly characterized as a gluttony of the memory. What is the course of study in nature in the common schools of this country, where fifteen-sixteenths of the people recive their entire education, and all who enter secondary institutions of learning must receive their preparation therefor? I answer, geography expanded in three or four books, and physiology in grades seven and eight. What philosopher, closely observing child nature, has learned that the child is intensely interested in distant capes and obscure towns and rivers, and not at all interested in this nature that surrounds him on all sides? The child, from infancy, is full of curosity concerning this nature, whose varied and interesting forms press about his every footstep. He is interested, not in any one special form of nature, not in any one kingdom or in any one part of a kingdom, which may be bound in a book and labeled "branch," but in the entire sphere of nature so far as it is adapted to his stage of development: in the burning of the fire, the expanding of the flowers and the habits of animals; in the dropped ball that goes racing toward the earth like a thing of life; in the water that rushes up the pump stock in obedience to the pressure of the air; in the succession of day and night and the seasons; in the king of day and the queen of night.

When, with boyish curiosity, a thousand times I watched the fish gracefully poise themselves and move at will in the streams of my Virginia home, a very little intelligent direction from the school would have enabled me to learn from observation that fishes use their fins principally in balancing, their tail in propulsion, and their air-bladder in ascending and descending. A like direction in childhood would have led me to improve my many opportunities of observing the chinch bug, the weevil and the Hessian fly; to compare the grain before and after the arrival of these pests, and to study their habits and methods, that I might have contributed my might toward the mitigation of these pests. Witness Prof. Snow's discovery that chinch-bugs are subject to epidemic diseases, and by distributing a few of the sick bugs in a field, through spread of the disease these pests may be destroyed by the millions. Our institutions of higher learning spend large sums on apparatus and laboratory, while our many common schools lament the poverty that deprives them of such equipment; yet behold the wealth of equipment supplied by lavish nature, alike to the rich and the poor! What volumes of illustrated intruction in the spring shower, the winter snow, the chattering brook, the rising sap, the bursting buds, the floating clouds, the over-arching canopy! What time so opportune for the study of the artistic structure of the snow-flake and the marvel of the condensation and precipitation of moisture as during a shower or a snow or hail-storm? No lapse of time will ever efface the memory of that ecstasy with which, in childish glee, we watched the pattering rain, or, with face skyward, we feasted upon the countless snow-flakes —near and far— noiselessly making their way earthward in obedience to the laws of gravity.

The future course of study in nature, in the common schools, will consist of topics from the three kingdoms of nature suited to the tastes and capabilities of the learner at the different stages of his development—the topics from the three kingdoms chosen with reference to the locality of the school, and those from the vegetable and animal kingdoms also with reference to the seasons or months of the year, so that whether inland or on the seacoast, in December or May, there would be the most perfect correspondence between the instruction of the school-room and the dominant life of the neighborhood. Each season, each month, each day, would bring its dominant natural phenomena. The pages of this great book of nature are ever open to him that would read; and best of all, it has its primer, its fifth reader and its advanced literature, its objective and subjective pages. It has its lessons for the superficial observer and for the philosopher, for infancy, for manhood and womanhood, and for tottering age.

But let us inquire what the above proposed reform in the teaching of nature includes. First, it includes the study of nature from earliest infancy to latest manhood and womanhood. This alone, by the old, irrational methods—gorging the memory of childhood as well as youth—would prove an injury instead of a benefit. And yet, what thousands of misguided primary teachers are ransacking text-books of natural science and ponderous cyclopedias, that they may gorge the memory of confiding childhood! Will He who gave us these windows of the soul, through which the mind might touch and handle and grasp the myriad natural forms—will He hold him guiltless who tramples His laws under foot? This proposed reform includes, therefore, not only the study of nature from earliest infancy, but that study primarily through the senses, and secondarily through books. But observation may be haphazard, fragmentary and fruitless—putting the mind in possession of percepts and concepts only, and these non-essential and dis connected. Such is the character of a large majority of the so-called object-lesson teaching. The pupils are permitted to speak of the unimportant and non-essential properties of an object following each other without regard to relations or unity of thought: "The crayon is large;" "The crayon is long;" "The crayon is white;" "The crayon is round;" "The crayon is light." No wonder the humorist, James Whitcomb Riley, has been able to convulse his audiences by reciting the burlesque object-lesson on the peanut. Ideas of size, color, form and weight should be taught by comparison with other objects possessing these qualities, and by comparison with the standard units of weights, measures and forms. Therefore, observation must deal with the essential qualities of objects and lead to a grasp of relations —to comprehension—apperception—mental assimilation. This dealing with relations—apperception—does not stop with a glance at the sparkling waters of the brook or an ear to their liquid music, but inquires what forces have polished the pebbles and carved out the brook's channel and the adjacent valley; what confluent rills have given birth to the brook; what countless water globules, in their aerial homes, have given up their individuality that the pattering rain drops may make the rills; what myriad sun-rays reach out through measureless space to break the waters of earth into vapor and lift them into cloud land; how brooks go to make up the tributary rivers, and these the Father of Waters, ever seeking the infinite sea. A profitable study of nature is not content with observing the form, size and organs of the tree, but traces the relations of the bud, flower and fruit; inquires concerning the materials and processes employed in manufacturing the stem, the leaf, the flower, the fruit; comprehends the relation of timber to man's shelter, the relation of the plant kingdom to the animal, and classifies both kingdoms into species, genera, families and classes.

Who can estimate the far-reaching influence of such rational teaching of nature upon the well-being and happiness of mankind? Man and nature—master and servant—heir and heritage—created He them. Man on the one hand, with his multiplied needs—physical, intellectual, moral; of food, clothing, shelter and transportation; of conceptions of truth, beauty and right; great nature—continents, oceans, enveloping atmosphere; resources, properties, forces—on the other, to supply these needs. When God, our Father, from eternity past, projected his creative energy, through all the bewildering forces, activities, transformations and products of nature—through all the motives, ideals, designs and deeds of man to eternity to come, He had but one supreme object in view, the perfecting of man created in His image. Every force that throbbed back in the earliest and most distant azoic era was fashioning earth for the abode of man; had in view the seed-time and harvest, the blossoming flower and the ripening fruit. In every march to battle, whether under the leadership of savage chief, with rude implements of warfare and doing homage to his mysterious Manitou, or military captain, trained in the arts of modern warfare, and worshiping the true and living God; in the rise and fall of leaders, empires and dynasties; philosophies, doctrines and religions; reforms and revolutions; in the birth and death of worlds, Divinity has had but one supreme object—the destiny of man. Such man's inheritance, if in the spirit of inquiry, in love and admiration, he woo great nature; such the promised land which Deity bids us go into and possess. For centuries man, confronted with this nature, crouched and feared. No rich heritage was his till he stood erect and inquired and loved. Every inventor who, during the centuries past, has harnessed a natural property or force to do man's bidding, has done so by observation and the investigation of relations—through sense perception and apperception. Only a meager heritage will ever be vouchsafed to those who gorge their memories on text-book natural science to the death of their sense-preception and understanding.

The inventor, wooing nature in proper spirit, with senses and understanding awake, grasps the relations of nature's properties and forces to man's needs, and transmits the heritage to coming millions. Man needs movement in machinery or in transportation of passengers or freight. The inventor observes the movement of the stream and hitches this movement to his boat or water wheel. The great Eads hitches the moving waters to the accumulated sands and cleans out the Mississippi for ocean commerce. Or, again, the inventor observes the moving winds, and, by means of sails, harnesses them to his boat, and behold the line of sail vessels from the rudest craft to the mightiest sail ship. Again, man desires a force other than human muscle, beasts of burden, moving waters or winds—a versatile and tireless force. The great Watts perceives that the same force that lifts the tea-kettle lid, if multiplied, will lift a steam hammer or the ore from the mine. George Stephenson sees that the same force that turns a wheel in mining or forging, will turn a locomotive driving-wheel on an iron track. Man needs clothing, and the inventor, through the process of spinning, weaving, sewing and dyeing, transforms the animal and vegetable fibers into fabrics to supply his needs. Arkwright and Hargreaves analyze spinning into the two processes of drawing out and twisting; secure the one by two sets of rollers revolving at irregular rates, and the other by spindles; man, by use of tanning, makes the hides of animals practically impervious to water; availing himself of the microscopic barbs of wool, felts it into hats. Man needs food. The chemist burns a few stalks of corn, of wheat, or tobacco, and by analyizing the ash, ascertains what minerals each plant takes from the soil, thus enabling him to fertilize intelligently; makes the cotton plant yield up all its utilities—fiber, oil, cottoneen (artificial lard), oil-cake, fertilizers.

Every day in professional and business occupation, in shop, in home, on farm, training in observation, and thought based upon observation, is brought into requisition. Day by day, month by month, year by year, the farmer is called upon to observe, compare, infer, decide, act. To attain the highest success, he must not only select the seed, stock and soil with reference to intrinsic or absolute excellence, but with reference to adaptation, the one to the other—the seed and stock to the soil, the seed to the stock, the seed and stock to the market. Again, machinery and laborers must be selected with regard to their relation to the occupation. As he sows and reaps and garners, he must regard the sunshine, the rain and the winds. The merchant should know his customer; the lawyer, his client and jury; the physician, his patient; the teacher, his pupil. Every step in the duties of the housewife calls for observation, thought, adaptation—not only in the selection of groceries and dry-goods, but in their adaptation, through cooking and sewing, to the needs of the household. No woman who has been taught rationally should make her table a Saharan desert of sameness. Only a trained and loving wife knows the permutations of the art of cooking—the changes to be rung in on the same meat and bread and fruit—the wonderful variety in the midst of limited purchasers. Were woman taught naturally, what labor-saving appliances would leap from her brain to alleviate the drudgery of household duties!

So much for the physical heritage of food, clothing, shelter and transportation. What of the intellectual and moral—of truth, beauty and right? With rational instruction, how the intellectual and moral man feasts on nature from the cradle to the grave—"young Spring, bright Summer, Autumn with her solemn form, and Winter with her aged looks." How she touches every chord of our being into music! What wonderful adaptations—light to the eye, sound to the ear, water to the fish, air to the bird! What ministering to our every intellectual and moral power! I stand in the depth of a pathless wood or on a boundless prairie, and nature pours her eloquence and music through every avenue of my soul. "The heavens declare the glory of God, and the firmament sheweth his handiwork."

L. E. Wolfe,
State Supt. Public Schools.

Hardy Peaches.

If peaches were as hardy as apples, there is no fruit that would pay the horticulturist as well as the peach. But from 10 to 15° below zero will surely kill the fruit-buds. To improve the hardiness of the trees, seeds of the hardiest varieties of both seedlings as well as budded varieties should be selected and planted out; when these come into bearing, the choicest and hardiest kinds should be cared for and the poor and most tender be cut out. Yellow and white varieties could be grouped so as to make crossing more sure. Each generation would thus be an improvement and a step toward the object to be obtained, and there should be no halt made, as there is no limit as to what may be reached.

If the several experiment stations would take hald of this and make it a branch of their work, and then exchange seeds of their most promising kind with one another, there is no telling what may be accomplished in a few generations, which would not require a very long time, as the peach soon comes into fruiting. We older horticulturists could not expect to reach the maximum of success, but it would enthuse our young men to take up the thread where we leave off, and the same improvement can be made in the future as there has been made in the past, when our luscious peach is the offspring of the once bitter almond.—G. F. Espenlaub, Rosedale, Kas.

Utility Plus Beauty.

L. A. GOODMAN, WESTPORT.

The first thought of man in his life-work is utility. It matters not where he is, what he is doing, how he is thinking, what he is seeing, where he is feeling his way, his first thought is the useful.

A poor old cripple, watching his wife eke out their scanty living with her needle, watching her day and night, his heart full of love for her and full of sorrow for their lot, as he sits there watching, a sewing machine is made in his mind to do this work. The thought of the useful uppermost in his mind brought out gradually a rough, crude machine that was able to do the work. No thought of the beautiful filled the mind of Elias Howe as his first machine grew under his hands, but only the thought of the useful.

It was not until years after the successful working of this same machine that it entered the heads of men to make them beautiful, and now we have them in all shapes and sizes, in boxes, cabinets, desks, etc., etc.

It never entered the mind of Robert Fulton to make a beautiful boat when he first formed the steamboat on the Hudson. His only motive, his prevailing thought, was to make a boat which would run against wind and tide, and so we have the rude, cumbersome, awkward and yet useful boat which succeeded in doing what its maker intended it to do. Now, years after, we have perfect palaces of steamboats, where are embodied the main thoughts of their builders to have a beautiful as well as useful boat.

In all the realm of thought and knowledge, the useful is the first and prevailing idea.

The old farmer used the forked stick for his plow with the only thought of utility. The old cast-iron plow had only this for its goal, and it never occurred to man until after he had developed this, useful to his needs, that beauty should have anything to do with it. Beauty and knowledge then go hand in hand, and we may be sure that as you find a nation increase in knowledge and learning, you will see them increase in the love for the beautiful and the useful, and not the useful without the beautiful. Utility plus beauty therefore is one of the facts which determine in our minds the civilization of a people.

You may take the rude huts of the barbarians, the log cabins of our fathers, the caves of the cliff-dwellers, or the wigwam of the Indians, and the first thought, in fact the only thought, which seems to enter their mind is the thought of utility, and so we have the low log houses, the rude cabins of our forefathers, built with the idea of the useful. Gradually as they grow older the thought of the beautiful enters with the useful, and we have some of them building anew, while many of the others who never can have the idea of the useful and the beautiful in their minds together, move their location to points where they can only think of the useful. So, many of our first settlers cannot look upon the beautifying of their country, and so go to a newer again.

The useful and the beautiful are the moving factors in all our business transactions. To those who think of the useful, in our day and age, the beautiful is the attractive quality. If it be nothing more than a mop, the thought of attractiveness is in your mind. The farmer thinks of this when he buys his plow, harness, wagon, horses, cows, hogs and sheep. Beauty is what attracts the eye. In fact, let the two be just as useful in this day and age, yet the idea of beauty will settle the idea of utility, and ofttimes overbalance it. If you wish a piece of cloth or a suit of clothes, it never occurs to you to take the useful when you can get the useful and beautiful together. The lady in search of the dress goods, after the first thought of utility, next looks to the beautiful, and ofttimes lets the latter run away with the former.

Yet for these ideas we know that the first thought of man in his work is the useful, and the great moving power of the world is the useful.

Today we have thousands upon thousands of persons working with this as their moving power; we have thousands who are using their brains for the furtherance of this idea; thousands who are inventing, day after day, the useful.

Scarcely a paper do we pick up but we see the list of patents, all more or less useful; and when these are perfected, then the thought of the inventor or some other is to make it beautiful, and the two must grow together as we grow.

So the first thought of man, I say, is to the useful, and the second thought is to the useful and the beautiful, and the last thought is to the beautiful alone.

This has been the growth in the line of horticulture as well. First a few apple, peach, cherry, pear—perhaps some berries, if there are no wild ones; utility, and that alone, is the thought of too many of our pioneers. They will cut down trees and shrubs, which in after years they would give thousands to have, and years of time to replace. I have known men to go into the evergreen forests and cut down every specimen within reach of the house and yard, and in ten years begin planting them to beautify. The only thought of too many of us is the useful, and that alone, and it is a grand mistake. We need at all times to unite the two and keep them in close union in order to get the most satisfaction out of this life.

The home is useful, but useful only as we make it perfect, and we cannot make it perfect unless we make it beautiful. Perfection is only reached by the close union of the two. The home is beautiful and yet not less useful because it is beautiful, when we have the landscape, the grass plots, the shrubs, the flower beds, the shade trees, the evergreens, all nicely blended for use and beauty.

One-half of our lives is a waste if we do not unite these two in all our work; one is as necessary as the other to the full development of manhood and womanhood, and to a full appreciation of life and its duties. "All work and no play makes Jack a dull boy" is still true, and the opposite is also true.

This is simply another way of putting the subject of this paper. All work makes a drudge, all utility makes dull feelings, slow appreciation, weak sentiments—a drudge also.

We want something higher and better, and so we look to the beautiful. It is only by the union of the two that the perfect development of character is shown.

Let us look over our own work in the same light: Did you ever go into an orchard when every tree was perfect in form and symmetry, and have it do your heart good to just see the trees, to look at them in their beauty? When, therefore, behind all this there is the fact of value in their products, then the appreciation of mind and body is filled to its satisfaction. So, in the beautiful yard and surroundings, it does the mind good to dwell on its grand trees, lovely lawn, handsome building, and all. Add to this, therefore, the fact of the utility it can all be put to, and you have the acme of perfection.

I plead, therefore, in this race for the useful, we neglect not the thought of the beautiful, as the one should go hand in hand with the other.

Let us not fail to use the useful and to beautify the beautiful if we want the most perfect life we are capable of enjoying.

The following extracts taken from a lecture of David Swing:

> The beautiful comes first in the order of nature. Many of our young persons suppose that the beautiful is the culmination of life; but just the opposite is true. The useful is the culmination of human thought and human effort. The child in his cradle will reach out after the decoration, after the boquet of flowers, or a brilliant ribbon. The savages in the west are all ornamenting themselves, but they are not seeking nor finding the paths of utility.

The sentiment originating with the human race and extending as the human race went forward and blossomed out into five great arts—architecture, music, painting, sculpture and literature, and in some one or all of these various forms it held the world subject for thousands of years.

Greece was ruined by the exclusive study of beauty. Greece omitted utility. It never grasped the great ends of politics or religion or social life, but, failing to see these, studied the architecture, sculpture, painting, music and the gracefulness of the human form. When Xerxes was approaching Greece with his army, the great men of that nation were standing around on the Olympian field. There were before their eyes chariot races, the foot-race, the shooting-match. A messenger came in saying that Xerxes was just over the mountains; and those Greek philosophers and statesmen resolved not to suspend the games on that account. What was worse than that, only 300 men went to the pass at Thermopylæ to repel Xerxes, and yet still worse, when Leonidas was defending the pass, Xerxes discovered another pass through which he flung a hundred thousand men, of which mountain pass the great Greek statesmen knew nothing of the existence. There was more statesmanship in the mind of Abraham Lincoln in his brief life than in all the statesmen of Greece for five hundred years.

But passing to the great period in which the beautiful reached its culminating point, we come to the time of Michael Angelo. Next to Shakspeare, Michael Angelo's was perhaps the greatest intellect ever born in the world, and since we do not know who Shakspeare was, whether he was Shakspeare only, or Shakspeare and Lord Bacon, Michael Angelo was the greatest intellect the world has produced. But he was born in a period when only two forms of thought occupied the human mind; one was theological thought—abstruse theological thought; and the other was that ornamental thought that decorated theology. Michael Angelo struck the world when the world asked for two things—either the abstruse theology or the external temple, the church, the cathedral, the basilic, and the paintings and statuary of the decorated church. Had Michael Angelo been born in New York in 1860, he would see before him perhaps twenty different professions. The pulpit would allure him, the lawyer's profession would allure him, the editorial chair would allure him, the military pursuit would offer its charms, the railroad interest invite his genius; or, if all of these things failed, there remained the lightning-rod agency and the sewing-machine industry and the book-canvasser's vocation; and if, in none of these did he find sufficient allurement, then some philosopher would say to him, "Go west, young man, go west." But in Michael Angelo's day only two voices sounded in his ear. One was, "Michael, either study theology of the church, or decorate this theology;" and Angelo chose the art of decoration. And, furthermore, the women of that period were all in favor of the decorative arts. Every woman of note in Florence and Rome cultivated the fine arts. Each morning, instead of taking a carriage and driving to the dry-goods store to purchase a few yards of ribbon, they would walk to where some sculptor was carving in marble, or an architect was rearing a temple, or a Raphael was painting a picture. There were not many of these women, but they were the inspiration of the age. In Angelo's day there were women who could recite all of Virgil or all of Homer from memory. Sometimes the artist would be in love with some one of these conspicuous women, and was thus inspired by that sentiment; and to be in love with some noble woman in those days was as natural as it is for us to be a Democrat or a Republican, or even a Mugwump.

At the beginning of the Sixteenth century there sprung up a development of the useful. The difference between the beautiful and the useful is this: The beautiful is a sentiment; the useful is a thought. The useful is the discovery of the great end and of the good way of arriving at it—the great end of the individual life or the nation's life. This definition places it beyond the reach of the infant, the Indian and the savage, and makes the useful depend wholly upon the method of thought. It requires thought to devise the good end and the discovery of a good way of reaching it. The railway which lies near your city is a good way for carrying around men, but that does not make it useful. It must also carry men on good errands or to a good destination. If your railroad were to undertake to-morrow to carry men to a prize-fight, it would be utterly worthless, because men going to a prize-fight would be wicked. Men going to a prize-fight ought to walk through deep mud. Men going to a prize-fight should all die on the road.

So the useful consists in a good way of reaching a good end. This makes it necessary that the useful be attained only by an age full of thought. Lord Bacon heralded the useful just about as Washington heralded liberty. Bacon did not create the useful, but stood in the midst of it and developed it. He became its speaker, its poet, its prophet. Previous to Lord Bacon the scholars of Europe were alll engaged in abstract thought about themes that had no application to human life. Lecky says that sometimes in Europe there were five thousand scholars gathered together in woods and camps for discussion and thought upon themes that had no application to human life. One of their favorite themes was the nature of the human spirit, and as to how many spirits could probably dance upon the point of a needle; and they would also inquire what kind of a club Cain killed Abel with—whether it was hickory, oak or sassafras; and one of those philosophers wrote twenty essays on the probable height of the Virgin Mary, the probable size of her hand or foot, and the probable color of her hair. They thought it disgraceful to come down to the common affairs of life.

And while the men were doing this kind of thinking the women were slaves, doing the drudgery; and this reaches over the pagan and Christian world up to the Sixteenth century. Xenophon thought the duty of the wife lay in keeping her husband's clothes mended and clean. Up to the Sixteenth century the women plowed the ground with a crooked stick, the men being far above the consideration of doing the plowing. The woman cut the grain with a kind of case-knife; she threshed the grain with a club; she ground the grain with a couple of rocks; she baked the bread in ashes. And the great man in the meanwhile was busy about the definition of spirit or the origin of the human race, or about the nature of the Deity or the nature of the devil. Into that world came Lord Bacon, simply to turn the attention of men to what are called the common laws of human life.

But neither the Greek nor the scholastic would ever come near human life. Bacon looks at that scene, and for the first time in the history of human thought he confesses the existence of the cart and the wagon road, the horse and the harness and the cabbages, and he says, "O, foolish human race, why do you not let the angels alone and make a good wagon road?" He says, "Why not feed that horse? The collar is made out of straw, the harness is tied together with strings. The Queen of England has just found her chariot mired in the mud, and has stood in the fence-corner while her courtiers pry it out. Why not make a good road?"

This is the Baconian philosophy—the study of the phenomena of the difficult, and the educement from the phenomena of general laws. After Bacon had unfolded this philosophy man began to leave the upper air alone and study the surface of the earth, and out of this philosophy came wooden rails, on which cars were drawn out of the coal mines. They found that one mule could draw four or five cars with wooden rails. Reason made them substitute iron rails. Further thought finally made them substitute the locomotive. The steamship began to cross the sea, the spinning-jenny sprung up, the reaping machine came, the sewing-machine came. Long before this the printing-press had come. The telegraph came. But these were feeble modifications of the useful compared with the unfolding of liberty. Liberty is that form of utility which distributes happiness to the millions. Happiness was once supposed to be for the king and the royal family. They discovered that happiness and property were to be for the millions. Then came general education—education handed over to the millions; and out of this Baconian philosophy there rolled the great volume of progress on in the Seventeenth, Eighteenth and Nineteenth centuries.

I congratulate you all upon having reached an age in which the beautiful remains as only an ornament of life, and not the whole of life. That, as the vine can ornament the cottage, but cannot keep it up, cannot be a wall or rafter to it, so beauty may ornament life, but can never be the great columns or foundations upon which life rests.

Mrs. Harrison's Bee Notes.

[In Prairie Farmer.]

Horticulturists and apiarists belong to the same family, but apparently remained in ignorance of the relationship until recently. California horticulturists persecuted bee-keepers and drove them to the distant canons and hills, alleging that bees were a nuisance and destroyed their fruit, especially their raisins. But several bee-keepers interested in fruit culture to a limited extent attended the California State Fruit Growers' Association at its late session at Los Angeles, and at its close something caused them to prick up their ears and listen with close attention. It was the subject of "Fertilization," and an extract from the paper was reported by one of their number as follows, in a late number of "The American Bee Journal":

> A gentleman stated that he had a friend in this State who started into fruit-growing several years ago, locating 35 miles from any fruit-growing section, or where any bees were located. The first year that his trees blossomed, and in expectancy at least some returns from his orchard, what should be the result but complete failure. He was advised to procure some bees to aid in the fertilization of the blossoms, and since then his orchard has been productive.

The accusation against bees that they puncture sound fruit has been made for years, and the verdict is reached that they are innocent of the charge. It is not disputed that when the skin of fruit is broken, bees will appropriate all the juice. I have noticed this in our vineyard; when the grapes were ripening during a very warm spell, and there was a shower, grapes cracked near the stem. Those grapes would be covered with bees, but as soon as they had removed the juice from the cracked grapes, there would be no more bees in the vineyard. None are ever seen upon sound branches. The wine-growers of France gather their grapes and leave them where the bees have access to them, so that they will remove the juice from all broken ones, claiming that by so doing a much fairer article of wine will be produced, as the juice of the grape, when the skin is broken, will ferment and sour.

When birds and wasps have punctured the skin of ripe peaches, pears and grapes, and there is no nectar to be had from flowers, bees will suck out their juices, and many persons will suppose that they tore them open. An observant person, noticing that bees had made holes through new Indian Head muslin, and had enlarged their fly entrance, jumps to the conclusion that if bees can bite holes in muslin and wood, they would have no difficulty in biting holes in fruit. Now let us make a careful examination of these substances: bees make holes by picking, not biting; they work industriously at the muslin, until they raise a lint, which they can pick off. I have seen a number of them together, pulling at a raveling to drag it from the hive, and at one time I lost a queen by her getting a thread wound around her body. In the same way they work at wood, raising a little fuzz, until they can grasp a fiber, and then keep picking at it. They cannot do this with the skin of fruit; it is too smooth; they cannot raise any nap or fuzz.

Where Wood Ashes Are Cheap Enough.

J. H. S., PARKERSBURG, W. VA.—On page 785 The R. N.-Y says: "What forms of potash will best take the place of wood ashes?" I was expecting to put ashes, made by burning white-oak slabs, upon my peach orchard. Is this not the right thing to do? Can something better be used? What are such ashes worth when fresh? They will cost $3 per ton in the orchard.

ANSWER.—Such wood ashes at $3 per ton give you cheaper potash than you can get in any other form. We referred to the farmers who are using ashes that cost from $9 to $13 per ton. For many years ashes were by far the cheapest source of potash. Now, the German potash salts are sold at prices that give cheaper potash than the ashes at $8 or over. White-oak ashes are excellent, and at the price named cannot be improved upon. They would sell readily at $13 on the Hudson river.

REPORTS OF COUNTY SOCIETIES.

FRANKLIN COUNTY.

The failure of our apple orchards I attribute to root-blight, bitter-rot and poor selections of orchard sites.

Root-blight is the worst, and the best authority gives us no light on the subject. My opinion is it is in the soil, as I find it on seepy ridges, down the slopes covered with black oak and hickory growth. Trees live only a few years, then rot at the roots while they are healthy above ground. I find, in traveling ten years along the Meramec river, that it is wide-spread, as also the bitter-rot, while on the ridges and on Bourbor river slopes it is hardly known.

My remedy is to dig a ditch one-half circle on the upper side of the tree and fill in with rocks to drain off the water. Use sand and gravel with well-rotted cow-manure in the holes when planting also.

Bitter-rot is contagious, and some kinds are more subject to it than others. It may be overcome by spraying with Bordeaux mixture. Select high, dry soil, with rock mixed in the soil all the better, and with a wind-break on the north and west.

Would like to see a committee on new fruits appointed, to whom all fruits could be referred before allowing them to be distributed.

C. H. English, Sullivan.

JASPER COUNTY.

L. A. Goodman, Secretary:

There is but little report to make. The Society still holds its meetings on the last Saturday of each month. Those for January, February, March and November were held in the city of Carthage; those for April, May, June, July and August were held at homes of members. In September and October no meetings were held.

At the summer meeting premiums were offered for fruits and flowers. Good displays of flowers were made at each meeting, and helped much to create a greater interest in them. But little fruit was exhibited, for the reason that no one had it to exhibit, except a few berries. Some of these were very fine.

The fruit crop was almost an entire failure—the nearest so that was ever known in this county, which used to be considered as especially adapted to the growth of superior fruits of all kinds. In 1890 and '91 strawberry growers received such low prices and met with so many losses that many of them have quit and the others have reduced their acreage very much, so that there is now only a very small amount raised as compared with two, three and four years ago. The season has been unfavorable to the growth of strawberries. The rows are mostly narrow, with plenty of "skips," but the plants look well, and with favorable weather in the spring, will probably produce a good crop that will sell at fair prices.

Apples, peaches, pears and cherries are believed to be in good condition, except some apple orchards seem to be on the decline.

Our members obtained their box and crate wood, as usual, last spring, through the Society, direct from the factory in car lots, and at the very lowest prices obtainable for first-class material. A great deal of money has been saved here by this practice, which has done more than any other one thing to keep up our Society. We use the wine-measure quart, for the reason that it is used by parties with whom we come in competition, and sells for the same on the market as a dry-measure quart.

Enclosed find papers read at our meetings.

Respectfully submitted.
Z. T. RUSSELL, Secretary.

THE CULTIVATION OF FLOWERS.

MRS. S. S. RILEY.

[Read at April meeting of Jasper County Horticultural Society.]

While every human mind is so created as to be susceptible to emotions of beauty, yet the objects by which they are occasioned are not always the same. The intellectual and the sensitive, as well as the material world, are calculated to awake the most pleasing sensations, and lift the soul to the highest contemplation of the infinite mind.

In considering the subject before us, we are inclined to turn our thoughts for a moment to the intellectual nature that needs growth and development, that it may enjoy the beauties which Nature so generously presents to us.

Perhaps the greatest natural flower-garden in the world is to be found in our western states and territories, over which the Indian has wandered for centuries. Yet we have no evidence that the savage mind became more docile, or that the delicate fragrance or the beautiful petals of a single flower ever created a happy feeling, or lifted his soul to think of the Great Being in any way only that He would lead them into the happy hunting grounds.

It is the cultivation of mind and soul that opens within us those fountains of pleasure that so many of us enjoy as we contemplate the beauties of nature. We are glad to know that the study of botany is introduced orally into the primary departments of our schools; also that house-plants are cared for and made to grow in our school windows. Powderly said, "Show me a man or woman who takes delight in growing or even in talking of flowers, and I will show you a man or woman who will not knowingly injure any other man or woman."

For months our winter landscape has been bare and naked, and now as the spring sun has warmed the soil and called from her bosom the life that she so tenderly protected from cold and sleet and snow, we begin to long for the buds and blossoms of the early spring. And to those who have been closely confined to the house during the winter months, the cultivation of flowers in the yard serves a double purpose. It gives health, vigor and strength to the individual, by means of requiring exercise in the open air. Then it furnishes food for the mind, as the nature and kinds of soil must be studied in connection with the nature and kinds of plants.

It is a pleasure to be enjoyed alike by the rich and the poor. It matters not how humble the home, taste, culture and refinement may be exhibited in window and garden. Refinement and education, though accompanied by poverty, command the respect of the intelligent and better class of society. Those possessed of these accomplishments must necessarily be more successful in dealing with the intricate affairs of life than others not so fortunate.

If there is one characteristic of the individual who loves flowers and enjoys their cultivation that is more clearly perceptible than any other, it is unselfishness.

I once heard a lady, who spends much time with her flowers, say that when she took her friends to look at them, the brightest and prettiest always seemed to say "'pick me," and she picked them.

Thus we find them cheering the sick-room, soothing the sorrows of the bereaved, giving hope to the despondent, and even adding joy and mirth to the gay and thoughtless.

"'Scatter flowers everywhere, for though voiceless they appeal most eloquently to that which is best in man."

"'To him who in the love of Nature holds
Communion with her visible forms, she speaks
A various language ; for his gayer hours
She has a voice of gladness, and a smile
And eloquence of beauty, and she glides
Into his darker musings, with a mild
And healing sympathy, that steals away
Their sharpness, ere he is aware.''

WHAT IS WOMAN'S PLACE IN MAKING HAPPY AMERICAN HOMES?

This is the question for our discussion to-day. I feel myself inadequate to open so important a discussion, and fear I can offer little new as to woman's work in the home. It requires a great deal of thought, study, experience and observation to discuss so complex a question intelligently. Indeed and in truth there seem so many duties incumbent on the average woman in the making of the home, that the very thought seems wearisome.

And what is the typical American home? American homes we see all around us, as varied as the flowers that spring up to brighten the prairie in the springtime. Some costly structures, beautiful in architecture, elegant in appointment, with all the modern improvements for the comfort and convenience of the household, with sanitary regulations the best that modern science can contrive, furnished with all the elegance of furniture, luxurious and restful, that one might well be fearful of forgetting life's earnest duties; portieres and throws, harmonious in coloring; books, pictures and bric-a-brac, rare exotic flowers to perfume the air and brighten with their coloring—everything that betokens elegant ease for some one and weary hours of toil for others.

There are American homes in all the different gradations, from the modern palace to the log cabin on the frontier and the dug-out of the prairie, and home is the sweet name bestowed upon each by some woman, young or old. There are homes that are homes, and there are homes that are houses.

We have met with you month after month, and listened with interest to the discussions of how to raise and market fruit in the most perfect condition, how to make each arable acre of land produce the most of which it is capable. We have listened to the recital of trials of the horticulturist in battling with the many insect foes that make such havoc among the fruits and grain; we have listened with interest to the suggestions of remedies for the extermination of these pests. Now we home-makers and home-keepers are to discuss a still more vital question—that of happy homes and woman's place in making them. We home-makers have as many insidious enemies to fight as the horticulturist, who would shield his apples, pears, peaches and grapes from the insect enemies that mar their beauty and cause them to become shriveled and worthless.

"Every man's house is his castle," and should be to him a place of safety and repose. In olden time men, and sometimes women, had to stand guard to defend their dear ones from wild beasts or some savage human foe. Foes no less dangerous exist now, and it is well that we stand guard at the threshold of our homes, armed with all weapons of defense, lest these enemies of our happiness gain a foothold in the sanctuary of our homes. We have waited long and patiently for the advent of men with moral courage to cast the ballot that would rid our fair country of the dramshop, the gambling den, and the places whose steps lead down to hell; and since the ballot is denied the home-keepers of our land, we await the time when some woman of genius shall arise, who shall discover some human insecticide, like London purple or Bordeaux mixture, and have the courage to do a little spraying for the extermination of these pests of society, that they no longer corrupt our young and desolate and impoverish our homes. (Just here my husband suggests that the women do the spraying without the s.) We have done that, and we have learned that faith without works is nothing, and that God blesses those who help themselves.

What is woman's place in making happy homes? That depends upon how much the man does. If husband and wife labor in perfect accord for the upbuilding and protection of the home, the labor becomes a delight and all things seem possible. We are able to do so much for those we love; the work goes unselfishly on from year to year, with no discord, each laboring for the protection of not only their own home, but all the homes in this broad land. But if, on the other hand, the home-maker, forgetful of his life duties, spends his earnings in debasing his moral, intellectual and physical faculties, the time will come when it will be a hand-to-hand struggle to provide food and shelter for loved ones, and the woman will not only have to be home-keeper but home-maker as well; and if from her children she can hide the disgrace and shame that has cast a shadow over the home, and train them to truth and sobriety, she may yet form the nucleus for a happy home, if not for herself, for her children.

The scoial horizon of woman has become broader than in the days of our mothers and grandmothers. Then the threshold bounded the sphere of woman's duties, and her sympathy reached out to neighbors in deeds of kindness in sickness and affliction. The tenderness of her heart and aspirations for the approval of her God found expression in never turning from her door a needy applicant for food or lodging, and she heard, in her inner consciousness, the words of approval: "Inasmuch as ye have done it unto the least of these, My children, ye have done it unto Me." Now woman's sympathy reaches out to all suffering humanity, and there are many forms of organized action for the betterment of society, and all these associations call for her support and active co-operation, and her heart is in full accord. Duty seems to call for her aid in many directions. Is there danger that those of her own household have less tender thought and care? Her sympathy is so drawn out to the poverty and suffering of the great mass of humanity—will she have less of loving sympathy for little trials and grievances of her own children, or will she still realize that her own children call first for her cheerful word of approval and home demands the best she can give? The woman of today cannot be expected to do as her grandmother did. There are other possibilities for her. She has duties that lie beyond the home, as well as in it. She must not neglect the practical, every-day duties of home; she must so systemize her work that she shall find time to help lift the burdens of suffering humanity, and thus fulfill the law of Christ.

"One has no voice in the selection of one's parent," and, if, as has often been said, "what one is, depends chiefly on one's parents," what a responsibility rests not only upon the mother, but the father as well, that the environments be such as shall develop the most symmetrical character.

We would give our children true freedom. What is true freedom? Lincoln said, "every man has the right to be equal to every other man if he can." But the victory in the race of life is to the strong. We must do our best that our children are well nourished, well housed, well clothed, well educated, every faculty trained and obedient to the will; then they can expect, in whatever occupation they choose, some reasonable degree of success.

How essential that the mother be well informed, that she be fitted to guide those committed to her care in the crucial period of youth. Let the mother seek, companionship with the best of books, seek to inform herself on all matters pertaining to the health and well-being of her household. The home mother must wage a continual warfare against dirt, with intelligent foresight, that all filth and everything that will pollute the atmosphere or become breeders of deadly diseases be disposed of in such a manner, that instead of being a curse, they become a blessing by being transformed into elements of nutrition and beauty. It is the home mother's place to know how to keep the sanitary condition of the home most perfect, that typhoid, diphtheria and diseases of like nature invade not the home.

We sweep clean and dust our rooms, and see that the sweet, pure air comes into our sleeping-apartments, and yet, if dirt and garbage are left to decay at our back door, and no adequate drainage is provided, we leave unguarded the most important part for the protection of our household.

She should see that the water supply is pure, or at least if she cannot remedy these evils that exist about her, she can keep the subject before the householder, and be sure he has intelligent information about the sanitary improvement needed.

For surely the mother is to blame if, when she sees the "ambushed foe lurking at the door of her home, she warns not the better-half to aim and prepare for the defense of his household treasures."

Let every woman study to make the expenditures come within the income; let her aim to teach habits of frugality to the household; let no material good thing be wasted; let the labor be systematized, for waste is waste, whether time or money. Thus more time is gained for recreations, and for the development of our faculties. It is one of the requirements of ethics that we develop ourselves, and thus help the rest of humanity; truly the expenditure of time and money for this purpose is justifiable.

Every mother should gain and retain the cofidence of her children; let her see that every step in the training of her children be a preparation for them to take still higher steps in the development of their own powers. Let her teach the girls, that they become adepts in all duties that are necessary to the harmonious development of the home, and let her teach all household ways and economies, not only to the girls but the boys. Let the boys learn the art of bread-making and dish-washing, for so many of the coming men seem so loath to pursue the higher education which the girls so eagerly seek to obtain, that they may find the tables reversed in the future, and they may be the home-keepers while the girls are the bread-winners and law-makers. There is an old adage, that the way to a man's heart is through his stomach; so every woman should seek to become an adept in cooking, and exert their best skill in preparing appetizing and healthful food for their families, remembering that mind and bodies are so closely united that what affects the one affects the other, and we cannot expect sweet-tempered children and agreeable and attentive husbands, unless we minister to their material comfort, nor can we expect high intellectual attainment if the body be poorly nourished.

We know that the woman of the house can give a congenial air, a home-like attitude to the interior of the home; her influence has much to do with the fashioning of the environment of the home; she wields a mighty influence, and if she knows how, can in many and subtile ways decide matters of taste in the arrangement of the lawn and building, without appearing to do so.

Self-forgetful and self-sacrificing in a thousand little acts of love and forbearance, woman can add happiness to the home, and though her labors of love are oft unappreciated and taken as a matter of course, and she longs for the word of approval, yet, in the assurance of duty done, and an approving conscience, her heart is lightened and reflects upon the househould.

Let the mother in every household remember that she is doing work that is permanent, that her example and precept are affecting the character of those about her, that it is work for life and eternity. Let her consider and tread carefully in all household ways. Time fails to enumerate the many ways and means by which woman can make happy the home. I leave it for your consideration and discussion. And though, perhaps, few of us ever realize our ideals, let us not lower them, but bring to the home, making the best efforts of which we are capable, and we may make even an humble home, homey and restful, and our loved ones may feel as the poet Whittier expresses it, that "It is a great thing to have a little bit of the Lord's earth up to the heavens," and happy ought we to be to rear thereon a Christian home.

Let us be of those of whom it might be said:

"I thought of lives thus lonely, clogged and pent,
Which yet find room,
Through care and cumber, coldness and decay,
To lend a sweetness to the ungenial day,
And make earth happier for their bloom."

Carthage, 1893. Mrs. George H. McCartey.

GREENE COUNTY.

The year just closing has been a very successful one for our Society. The meetings have been well attended, generally very interesting, and many new members added. From May to October, inclusive, our meetings were held out-doors, at the homes of the members. At these meetings the ladies were out in large numbers, bringing with them a basket of good things to eat, and generally a collection of flowers. The display of flowers this season has been the finest I have ever seen since becoming a member of the Society. Vegetables have also been shown in large quantities. In the way of fruits, although we have had specimens at each meeting, the quantity has been very limited, owing to extreme scarcity. Premiums have been awarded to the best of all articles in competition, and in this manner quite a little sum has been paid out during the year. Our financial condition is good, having now a balance in the treasury of $150. It has never been less than that in five years. Quite a number of good papers have been read before the Society this year, among which are the following:

Small Fruits, How to Plant and Cultivate—G. W. Hopkins.
How to Grow Pears—H. H. Park.
Bees in Horticulture—W. T. Zink.
Our Best Bedding Plants—J. Kirchgraber.
The Necessity of Intelligent Study of Horticulture—Major E. D. Parce.
The Best Fertilizer, Fresh or Well-rotted Manure—Dr. Hensley.
How to Grow Grapes—S. W. McLaughlin.
The Mission of Flowers—Miss E. Lindsay.
Trimming of Large Trees—J. Kirchgraber.
Crown and Piece-root Grafts—Dr. J. Hensley.

These papers will be furnished the Secretary, and such as are desirable can be published in the annual report of the State Society. The year about to close is another one added to the list of short fruit crops.

This year has been the nearest a failure in fruits I have ever known in Missouri. Two short crops in succession, together with the financial depression, is enough to discourage the stoutest heart. But we are promised that "seed-time and harvest will always come," and let us indulge the hope that at the close of another year we may rejoice in having harvested a large crop of every horticultural product grown in the great State of Missouri.

During the winter let us take a retrospect of the past, and see if we cannot learn something from these failures. I believe I have learned some lessons that will be of benefit to me in the future. But I see I am getting away from my subject, and will close by hoping you will have a good meeting, and regret that circumstances are such that I cannot attend. G. W. HOPKINS, Secretary.

BEES AND FRUIT.

W. T. ZINT.

This is a very important subject, one in which both the apiarian and fruit-grower are alike interested, and the fact should be thoroughly understood, that without this source of impregnation of blossom, fruit could not mature to any profitable extent.

Some flowers produce only stamens or the male organs, while others—sometimes on the same plant in certain species, and in other species on entirely distinct plants—produce pistil or the female parts of the flower; and still other species produce both stamens and pistil in the same flower. Those possessing only pistil must, of course, have pollen brought from the stamens, or they will not produce fruit; and, again, some of those possessing both stamens and pistil cannot be fertilized by the pollen of the same flowers in which it grew; or if fertilization does take place it is very imperfect, hence must have pollen brought from another flower to insure the perfect growth of the fruit, hence the need of the aid of insects or the wind to insure the productiveness of some of our plants. Red clover is a good illustration of a plant needing the aid of insects, and in this particular case the bumble-bee is the insect that performs the work of cross-fertilization.

Again, there are other plants which reproduce by what Gray calls close or self-fertilization—that is, the stamens of any particular flower fertilize the pistil of that flower—and in these bees can play no important part; and conspicuous among these, as Prof. Cook well says, are wheat, oats, etc. The importance of cross-fertilization is not to be under-rated in discussing this question of bees for the plant.

Mr. Darwin has shown, by a long series of experiments, that self-fertilized plants, that are fertilized by their own pollen, are generally very much inferior in vigor and power of constitution to those that are cross-fertilized. So if you want healthy and fruitful plants and trees, you must avail yourselves of the work of the bees. Many fruit-growers and gardeners have been aware of these facts, and made use of them.

Mr. A. J. Root found a green-house in New York where bees were kept at work all winter, to save the otherwise laborious and expensive mode of hand-fertilization.

Some one may ask why this mixing up of the pollen of various plants will not create great confusion in the vegetable kingdom by the production of hybrids, etc. It was observed by Aristotle, more than 2000 years ago, that bees visit the flowers of the same species as long as they can. This has been confirmed by my own observation.

Bee-keepers have never complained because fruit-growers planted largely around their apiaries, but to the contrary, they have encouraged the planting of fruits; hence their position has been merely a defensive one. They showed the war-paint only when poisonous substance, set out to kill off, or when fruit-growers sprayed their orchards with poisonous substance during the time the trees were in blossom, or again, when efforts were made to secure, by legislation, the removal of bees from certain localities as a nuisance.

It has been claimed that bees puncture fruit. Anyone who will examine carefully the jaws or mandibles of a worker-bee will see at once that they are not made for cutting hard, tough substance, and this is one of the best evidences that they are not in the habit of doing it, for in the entire economy of nature we find all organs adapted to the work they are required to perform.

I am well aware of the fact that bees work on over-ripe or half-decayed, or fruit punctured by birds, wasps or insects at such time when no honey can be gathered. Such juice soon sours in the hive, becoming unfit for food of bees for winter, and disease and death is the result. Many bee-keepers are fruit-growers, and their testimony universally agrees with the statements here made. Fruit-grower of no less repute than Samuel Miller says: "My full crop of apples was due, I think, to the bees." His sons have a large apiary near his orchard. He further states that upon inquiry he learned of other orchards whose crop this year (1892) are credited to bees. Prof. Waite of Washington advises all fruit-growers to keep bees. He says: "Bees do more to fertilize flowers than any other insect." If horticulturists and agriculturists would attend each other's conventions and discuss these questions of mutual interest, it would be found to be profitable to both.

THE MISSION OF FLOWERS.

MISS E. LINDSEY.

God might have made the world without flowers; but the fact that He did not is sufficient to prove that He not only loves them himself, but wants us to.

I hear people (mostly men) say, what's the use to bother with flowers? there is no money in them, and you cannot eat them. True, to the average farmer's wife or daughter there is no money in flowers. But then it is written, "Man shall not live by bread alone;" and "Consider the lilies, how they grow."

If the Maker of the universe could spend his time in creating flowers, surely poor little mortals like us could not be more usefully employed than in tending and caring for them.

Beauty in the divine economy is one of the most potent factors in the elevation of the race. We are all more or less susceptible to beauty of form, or color, to harmony of sound. The ministry of flowers, though a silent one, is full of such sweet persuasiveness that even the sinful and debased cannot resist their influence. And the language they speak is always one of love, of hope, of peace, of blessed harmony.

"We heard not a sound of their marshaling feet,
Saw ne'er a gleam of a spear,
'Till their tents stood saucily fronting each street,
And the army of blossoms is here."

Whether gracing the family table with their subtile air of refinement, the marriage altar with light and color, or placed on the bier of the dead by the hand of affection, they speak the universal language of the soul.

So innocent and sweet is the ministry of flowers that every one must own their sacred benefits.

The ministry of beauty is one of universal sway. And why should we not confess that in God's thought the most beautiful and winsome things were intended to reach souls that thoughtless hearts would never find.

A study of nature leads us to believe that since the very dawn of life on the earth, flowers have held a very important place in the happiness and civilization of mankind.

When we consider how much they brighten our homes and cheer our lives, we cannot help wondering that they are not more generally cultivated.

Many people would do well to use less money for showy furniture and useless bric-a-brac and fol-de-rol finery of every sort, and put the money thus saved in seeds, plants and shrubbery for the beautifying of their homes, whose back yard and front yard are as barren as a sea beach, while the parlor and dining-room are so full of fancy frippery of all kinds, that it is almost perilous to attempt to enter them.

Besides, the exercise in the open air and sunshine of caring for her plants would make the average society woman's cheeks less colorless, and her eyes less dull, and her mind brighter, and her heart more tender and pure, and her whole life more what a woman's life was intended to be—an honor to her Maker and a blessing to mankind.

A sacred burden is the life ye bear;
Look on it, lift it, bear it solemnly;
Stand up and walk beneath it, steadfastly;
Fall not for sorrow, falter not for sin,
But onward, upward, till the goal ye win.

I read in a paper not long since, that in a town of several thousand inhabitants, and containing 10 or 12 churches, not a lily could be found for Easter decoration.

If more women would imitate the life of that lately departed saint, Miss Jennie Cassaday, the world would be the better for it. From an invalid's couch, in her sister's home, she organized and for many years superintended the flower mission of the W. C. T. U. By a distressing accident in her early girlhood, she was a helpless invalid to the day of her death. But her great soul reached out after sick and suffering humanity with a love and devotion almost divine. There were none too poor, none too low, none too sinful or degraded to receive her loving care and sympathy.

But she has been promoted.

"Chaplets for her today,
  And garlands in her name;
Let all the church' altars blaze
  Blood-red with fragrant flame.
Bring roses, royal red;
  Bring lilies like the drift
Of northern snows, and from green beds
  Pluck pansies for our gift.
Sift over her, oh sun,
  The gold of summer skies;
Shine softly, stars, above the grave
  Where this dear sleeper lies!
Sunshine and song and flowers,
  Green wood and waving tree,
The ocean's murmur, summer winds,
  And all things glad and free.
May blooms and songs of June,
  And all the lift and stir
Of happy, buoyant life and tune.
  Come with the thought of her
Who has them all today,
  Treading the sunlit slopes
Of God's eternal day."

The mission of flowers in hospitals and the homes of the poor cannot be better expressed than in her own words.

I am one of those who believe that the ministry of flowers may lead to material improvement, to a higher civilization.

That a bright potted plant may demand of the most degraded woman a cleaner pane, the cleaner pane reveal the dirty surroundings, and so on until a new sanitation takes place, and from this grow happier homes and improved lives.

Think of one lying shut in with pain, surrounded with all the ill conditions of poverty, nothing to brighten or alleviate lonely hours, and of what it would be to have a tender-hearted woman or a bright-faced young girl come with a little knot of something white, something bright and something sweet—my rule for making bouquets—and lay it on the pillow or in the hand.

> They that can wander at will
> Where the works of the Lord are revealed,
> Little guess what joy can be found
> From a cowslip out of the field.

We might bring many incidents to illustrate the blessed mission of flowers, but there are none more touching than the following pathetic story of a white rose, emblem of womanly grace and purity.

A lady once visiting a prison, had distributed all her flowers but one perfect white rose. She inquired, " have I seen all the prisoners ?" "No, there is one you cannot see ; her language is too vile." "She is the one who most needs me." Being greeted with curses, she made no reply, but left the rose in the woman's cell. As she turned away she heard a heart-breaking cry and the one word, "mother, mother, mother." As she told the visitor her sad story, she said : "That rose was just like one which grew by our door in Scotland—my mother's favorite flower." And so the dawning of a better life came to this erring one, through the ministry of one pure white rose.

> Rose of the desert! thou art to me
> An emblem of stainless purity;
> Of those who, keeping their garments white,
> Walk on through life with steps aright.

In the children's hospital many pathetic incidents could be told—how they reach out their little wasted hands for the bunch of mignonettes, the pretty rosebud or dainty sweet pea, and spell out the gospel texts, tied on the bouquet with a white ribbon, emblem of purity and peace.

Sometimes the flowers have been found in the little hands after they were cold and still. The greatest beauty of the work is that it makes children of grown men and women, and gives wisdom beyond their years to little children.

If more young people would engage in flower-mission work, it would enrich and mellow their own lives, and add beyond all telling to that faith in human nature which, alas! does not very richly grow in the soil of poverty, intemperance and crime. But it is the heavenly instinct, and which can be planted even in the least fertile places, and has not failed to yield a rich harvest.

Even into the slums the flower-mission has found its way, where a rose is as rare as a star, and many homes have been brightened and hearts cheered by its blessed ministry. Many touching stories have been told of hardened criminals who wept like children at sight of flowers like those which grew by their mother's door in the days of their innocent childhood, and who received, with penitent and believing hearts, the message of salvation which accompanied them.

A child's love of flowers is almost universal, especially city children, who see so few green and growing things. Witness the little geranium or other plant growing in a tomato-can in the window of almost any tenement house in the city. And they often have better success with them than their more wealthy neighbors, I suppose on the theory that flowers grow best for those who love them.

All the young leaves sang together
  With a murmurous throb and stir:
We must hasten, June is coming,
  We must grow and grow for her,
For she loved us till her loving
  Won our secret from the sod ;
Till she knew each tiny blossom
  Held for souls the love of God.

One of the best uses of flowers would be to plant them in our school-yards. If Arbor day was more generally observed, it would be the better for the children. Or if there were 365 Arbor days instead of one, it would have an elevating influence on the children. And whatever helps the children helps the fathers and mothers. If the school-yards were full of flowers and plants, all to belong to the school, to study and cultivate, education would become a pleasure and not a burden. Children learn to love the cultivation of what they study ; and also the study of what they cultivate. Very few children thus educated would leave the farm for the city. The fact is, we have been educating our children away from the farm, and not to it.

Only think, if all the school-houses in the land were set in an acre of flowers, what a mighty force for the moral uplifting of the nation, for flowers and impurity cannot go together. Study would be a pleasure and not a task—especially botany and entomology, for bugs and flowers will often be found on the same stem—the bug jolly and fat, the flower faded and wan. How much we miss in this life because we fail to see the beauty in the common things about us. Who that has an eye for the works of nature has not admired the stately beauty of the yellow and purple gerardia, the dainty blue of the wild larkspur, to say nothing of the brilliant sunshine of the beautiful golden-rod that lines our country roads. Many a long, weary ride has been brightened and made more cheerful by their presence, standing there in the dust and heat, saying to the passer-by :

"Though the way may be dreary
 And the day long and weary,
 After all the bitter strife
 Of this ever-changing life,
           Rest, sweet rest."

Many railroads are beginning the planting of flowers and shrubs along their lines, notably in Pennsylvania, where some of the decorations are very elaborate. How cheering and restful to the tired eyes and weary hearts of the passengers. For there could be nothing more pleasant and attractive around a station-house than flowers. If more railroads would adopt the plan of railway gardening, the whole country would bė the better for it. What a change from the dingy old station-house or the average railroad.

I come now to a part of my subject that I take up with considerable diffidence. But as I am talking about flowers, I can but give my views. As Elihu says, "I can but show mine opinion."

The national flower or emblem—what shall it be, or rather which shall it be? for I believe the choice lies between the brilliant and artistic golden-rod and the useful maize, or corn. It is self-evident that we ought to have a national flower. Almost all other countries have one, that time and associations have endeared and made conspicuous. Which shall it be, grace and beauty, or utility and strength? Something to please the eye or tickle the palate? I vote for the golden-rod, even though it has a coarse leaf and somewhat the reputation of being only a weed. Yet no wild flower from June to November is more frequently gathered by young and old for personal adornment or as a rare flower. And it is undoubtedly the best known and loved of any wild flower on the continent.

"Oh, not in the morning of April or May,
When the young light lies faint on the sod,
And the wild flower blooms for half of a day,
Not then comes the golden-rod.

But when the bright year has grown vivid and bold
With its utmost of beauty and strength,
Then it leaps into life and its banners unfold
Along all the land's green length.

It is born in the glow of a great high noon,
It is wrought of a bit of the sun;
Its being is set to a golden tune,
In a golden summer begun.

No cliff is too high for its resolute foot,
No meadow too bare or too low;
It asks but the space for its fearless root,
And the right to be glad and to grow.

It delights in the loneliest waste of the moor,
And mocks at the rain and the gust;
It belongs to the people; it blooms for the poor;
It thrives in the roadside dust.

It endures though September wax chill and unkind;
It laughs on the brink of the crag,
Nor blanches when forests burn, while in the wind,
Though dying, it holds up its flag!

Its bloom knows no stint, its gold no alloy,
And we claim it forever as ours;
God's symbol of freedom and world-wide joy,
America's flower of flowers."

THE VALUE OF HORTICULTURE.

BY E. D. PARCE.

The questions that have been assigned to me as the foundation of a few remarks, on this most interesting and pleasant occasion, are, "The value of Horticulture, and the necessity of its intelligent study by those interested in its pursuit."

At first I was at a loss to know why I was selected to speak on these questions; until it occurred to me that perhaps it was because I knew less about them than many of you here, who have devoted years to the investigation of their various phases, and that I would, as a matter of necessity, feel most keenly the importance of a more thorough knowledge of this grand and noble pursuit of Horticulture, and would speak from a personal standpoint. In these days of deep and earnest research into the hidden myteries of nature, and the wide range of subjects that invite study and careful investigation, it is hardly possible for a man in the ordinary walks of life to become thoroughly acquainted with a particular industry, unless he devotes himself to it with the purpose of mastering it in all its details.

I was raised on a farm, and from childhood have been familiar with the general routine of farm labor, which included some knowledge and practice of horticulture, and have never ceased to retain an interest in the soil, and some of its many varied productions; but I confess that while moderately successful in ordinary farming, I am a long way from being a model farmer, and still further away from being a master in the science of horticulture.

I have, however, recently connected myself, in a financial way, with that most inviting branch of industry, and the more I investigate, it the larger, more interesting and the more important the subject appears to me.

On the principle that where a man's treasure is, there will his heart be also, I expect to maintain an ever-increasing interest in the business of horticulture; and I already see that however much I may learn about fruits and their production, there will continue to open before me most inviting fields for study and research, and the more knowledge I gain of the industry, the broader and more interesting the field to be surveyed appears.

In all ages of the world, among barbarous, civilized and enlightened people, fruits have ever formed an important part of their food, and on large portions of the globe it would be almost impossible for them to exist without the native fruits.

This is especially true of the warmer sections, where fruits fresh from the tree or vine are daily used, and no other kind of food could be substituted for it, and the people maintain so comfortable an existence as they do, with their fruits ever ready to be plucked and eaten.

Fruits form a very considerable article of commerce, and wherever transportation facilities exist, they are exported from the place of production and consumed by those to whom they are real luxuries, generally promoting the health of the consumers, as many fruits supply to the system those elements that go to make up a vigorous and healthy body.

Of the extent and variety of fruits gathered and consumed every year by the fifteen hundred millions of people on the earth, we can have but a faint conception.

I will only give a table of the imports and exports of fruits as they are given in official reports of the Government.

The fruits imported into the United States in the year 1892, on which a duty was paid, were as follows:

Figs, 8,338,750 pounds, valued at $511,142; lemons, valued at $4,548,263; plums and prunes, valued at $437,271; oranges, valued at $1,210,338; preserved fruits, valued at $1,234,828; all other kinds valued at $538,306. The total amount on which a duty was paid was $9,444,457. Total amount paid out for bananas, cocoanuts, currants etc., on which there was no duty, was $9,649,578, making a grand total paid out on fruits imported of $19,093,035. This was a falling off from 1891, of $4,661,090

Now what did we export in the way of fruits last year? Dried apples, $1,288,102; green apples, $2,407,956; preserved fruits, $1,558,820; canned fruits, $214,738; all others, $1,095,854—making a total of $6,565,461.

This amount is more than double what we exported in 1891, as we sent abroad a total of $2,384,176. So it would seem that we are increasing our exports and reducing our imports, but there is a matter of some twelve millions of dollars against us yet.

But what most directly concerns us is the best means of developing the fruit industry of this portion of our country, to supply, as far as possible, the ever-increasing demand for fruits.

I believe it to be our best policy to produce here all that can be profitably grown to supply the wants of our people, so far as they can be supplied, and have a generous surplus to send to less favored sections, in order to adjust the fruit accounts, and in time leave a good balance of cash in our favor.

How to do this may properly be termed the burning question, because if we do not properly solve the problem, and we continue to indulge our cultivated appetite for fruits, we shall find that a good-sized hole has been burned in our purses, through which our dollars, whether of gold, silver or paper, will continue to slip out of sight and out of our reach.

It has been clearly demonstrated that we have here in this section of the country a climate and soil well adapted to the cultivation and production of many of the fruits common to this latitude, particularly of apples and some other kinds of fruit, and we should seek with earnest diligence to develop this branch of horticulture.

How best to do this, I may say, is a large-sized question, and fully ripe. We have seen that we import over $19,000.000 worth of fruit, besides the vast amount we produce, and that we export $6,500,000 worth.

The market may be said to be open for us to do our very best for both home and foreign markets; our people will eat tempting fruits if they can buy them; and the more tempting they are handled and prepared for market, the quicker they will sell, and the better price they will bring.

We have in the Ozark section every needed variety of hill, valley and slope for our orchards, and they may be so protected by growing timber, that they will be comparatively safe from the effects of strong winds of less force than a tornado.

By careful experiments with new varieties of apples, pears, peaches and other fruits, as they are brought out and presented to the growers of fruit, we can continue to improve both the quantity and quality of the products of our orchards and vineyards.

We may also diligently study and compare results that have been recorded in such societies as this, and carefully record all important discoveries made by our own members, in the search for the best.

We should also seek to rid our orchards of destructive insects, as by this means alone can we be able to raise fruit fit to send into a competing market.

And now, if I have said a word or dropped a hint that will be of value to any member of this Society, I shall not have spoken in vain. I earnestly hope we may all live to see the day when the dwellers of the Ozarks shall literally sit under their own vine and fig or other fruit-trees, and that there will be none to molest or make afraid that they will not have a full crop of the choicest and best of fruits.

PEAR CULTURE.

BY H. H. PARKS, SPRINGFIELD, MO.

My experience in growing this fruit has been confined almost exclusively to that much-abused pear, the Keiffer.

Perhaps by giving you an account of the location and treatment given my orchard, which so far has withstood the blight, that terrible scourge of the pear-tree, we may arrive at some conclusion in regard to the cause of success or failure in pear culture.

My orchard is on the brow of a hill, slightly sloping toward the southwest, and on land which, when purchased two years previous, was considered worn out. The soil might be termed mulatto, with clay subsoil.

Generally, in plowing I turned the furrow toward the tree, so that the trees now stand about six inches higher than the center between the rows. In the fall of 1886 the ground was thoroughly prepared after taking off a crop of corn. Deep furrows were then plowed 18 feet apart, and large holes dug the same distance apart in the furrows. The trees had previously been heeled in in small bunches, so as to prevent disturbing many at a time. I believe more young trees are lost by having the roots exposed to the sun and wind, than from any other cause. This was prevented by putting these small bunches into a pail of water, and placing directly from the pail into the holes already prepared. The roots were set a little deeper than they grew in the nursery row, keeping them as near as possible in their natural position, and shaking the tree slightly as soil is being shoveled in, being careful to have the dirt well packed around the roots.

These trees were two years old, and by paying an extra price, I had my choice out of a large lot. The difference in price was slight compared with the difference in value a few years later. I selected good roots in preference to fine tops.

After the trees were all planted a furrow was turned both ways toward the trees, which filled up the deep furrow previously plowed, at the same time banking up the trees about three inches, furnishing a protection during the winter. Then a mulching of good manure was applied, also four shovels full of unleached ashes to each tree, spread evenly to a distance of about four feet.

I trimmed off the side shoots, but did not cut back. In the Agricultural report of 1889, an account is given of experiments made on pear stock to ascertain the results of non-pruning. These trees were cut like walking-canes, and no farther pruning was permitted. In the course of two years long shoots and limbs were covered with fruit spurs from bottom to top, while on the other hand, where shortening-in had been tried, a thicket of young shoots were produced instead of the fruit spurs.

The non-pruning which my trees received produced a fine-shaped tree. The manure and ashes referred to were all the fertilizers applied for three years. During this time two crops of oats and one of sowed corn had been raised on the ground, when the orchard was seeded to clover, which still remains.

Within the last three years eight loads of ashes, two of refuse from the gas factory, and four of manure from the blacksmith shops, have been applied to 450 trees.

The last two years the trees have been sprayed three times each spring with Bordeaux mixture, and whenever any blight appeared it was cut off.

Some writers advise heavy manuring for most varieties of pears, but as far as my observation goes, the blight is more prevalent where the soil has been highly manured. The same year my orchard was planted, a few trees were set in the garden, which received more cultivation and the soil was much richer. These trees are all dead but one, which shows signs of decay.

Mr. S. I. Haseltine set out a large number of Keiffer pear-trees, which received extra care and fertilization. The greater share are now dead. So we would infer from these experiences, that this variety of pear at least does not thrive under high cultivation. Now, do not understand me to advocate neglecting this tree. Ashes seem to be the food adapted to the pear, and I would advise a plentiful supply.

The Keiffer has stood more abuse than any other pear. Many denounced it at one time, but now speak of it with praise. I heard our honored President remark that it was little better than a chip to eat. I think after seeing it properly ripened he would choose the pear every time. What I have gathered in regard to pear culture by reading, leads me to conclude that the best results are obtained by grafting on the pear-roots, instead of the quince. I believe that like produces like, and the roots affect the quality of the fruit. If this is so, care should be taken to secure seed from the best varieties to produce roots for grafting.

Reports from the Experimental Station at Washington give account of 60 varieties of pears being grafted on both quince and pear-roots. The experiment proved that a large number of the standards came into bearing as early as the dwarfs. Among these were the Buffum, Howell, Bartlett, and others.

In harvesting this fruit, especially the Keiffer, it should be gathered as soon as matured, but not allowed to ripen on the tree. After picking carefully and storing in a cool, dark place a few weeks—probably two—will produce a well-ripened and highly colored fruit.

If trees are heavily loaded, they can be thinned out before fully maturing and treated in the same manner as stated before. This thinning is an advantage to the remaining pears, and makes fair fruit for canning.

LINN COUNTY.

Below I make a brief report of the fruit crop of this county for the past season:

Apples, the nearest a failure in 20 years. The fruit set on so scarce that spraying was resorted to only in a very few cases, consequently what few apples we have are knotty and inferior, and are not keeping well.

In pears, Keiffer and Duchess yielded half a crop. Nearly all other varieties were a failure.

Peaches, seedlings yielded an average crop; the finer budded varieties not more than one-fourth of an average crop. If I should undertake to grow peaches in this latitude, I should discard most of the budded varieties and select seed from the choicest and hardiest seedlings, taking care, of course, to select from trees that come somewhere near reproducing themselves.

The curculio were as numerous as ever, consequently few plums.

Cherries, hardly enough for the birds.

Grapes, about one-half an average crop.

This county was visited by a severe hail-storm about the time grapes were opening their bloom, and as the shoots were young and tender they were badly broken off. By spraying every 10 days up to the time of beginning to ripen, we were able to grow to perfection such varieties as Pocklington, Martha and Elvira, which were only a disappointment before.

Gooseberries, one-fourth of an average crop.

Currants, an average crop.

Blackberries, one-half an average crop.

Raspberries, a short crop—say one-third of an average crop. Anthracnose is doing bad work. Many farmers and small planters say that certain varieties are "running out," when in fact it is this disease that is ruining their plantations. Question: Can plants from a plantation affected with this disease be kept healthy by spraying? Some one please answer.

[Continual spraying with the Bordeaux mixture will prevent it.—SECRETARY.]

Strawberries, half an average crop, with Crescent, Haverland and Warfield No. 2 in the lead.

On the whole, the fruit crop the past season has been rather discouraging; still, by perseverance in fighting our fugus and insect enemies, we hope for better crops in the future.

Respectfully yours,

G. P. TURNER.

Meadville, Mo.

BARRY COUNTY.

MR. L. A. GOODMAN, Sec'y State Society:

I submit the following report for Barry County Society:

We have 15 members, and all take an interest. We hold our meetings the last Thursday of each month, at any place in the county where invited. Our topics are confined to the growing fruit of all kinds. Some member writes a paper, and all discuss the same; then it is published in some of our county papers.

We had a fruit, grain and vegetable exhibit at Exeter in November, which was very satisfactory, considering the effort we made. The society voted unanimously, to hold annual exhibits every year, of the same kind. Now, the fruit-growers and farmers will have proper time to grow and select choice specimens of fruit, grain and vegetables. We are certain to have a much larger and better exhibit next fall; so you may expect an exhibit from Barry county at the next State meeting in 1894, although the past season has been very dry and hard on the trees and plants, commencing in July and continuing to the present, December 1, except a few showers, scarcely enough to sow wheat, we have faith in Barry county soil, climate, etc., and with our determination we expect to succeed.

G. G. JAMES, Sec'y, Exeter.

H. C. FITCH, Pres, Seligman.

COLE COUNTY.

JEFFERSON CITY, Oct. 19, 1893.

L. A. GOODMAN, WESTPORT, MO.

SIR—We have organized a horticultural society in Cole county at last. It took hard work, and we had a slim attendance at our first meeting. Our next meeting, October 28 at the court-house in Jefferson City.

List of members—J. A. Hunter, Bass; T. M. Barker, Fred Buehrle, A. J. Davis, A. D. Sellers, F. G. Fulkerson, M. M. Daughtery, Joseph Railton, Jefferson City; Geo. W. Spurr, Scotts.

Officers—T. M. Parker, president, J. A. Hunter, vice-president, Fred Buehrle, treasurer, A. J. Davis, secretary.

Ordered the proceedings be published in the city papers and Colman's Rural World.

Will prepare a paper on our native birds for our winter meeting at Fulton.

Respectfully,

A. J. DAVIS.

MO.-ARK. HORTICULTURAL SOCIETY.

MAMMOTH SPRINGS, Ark., Dec. 1, 1893.

The third year, closing today, of our society is marked with a degree of progress and success that is truly gratifying to those of us who undertook the organization of a horticultural society among the foothills of the Ozark mountains. The Mo.-Ark. Horticultural Society, that has two homes, one in Missouri and one in Arkansas, is now one of the fixed and permanent organizations of Oregon and Fulton counties—a home where the fruit grower can come and exchange valuable ideas and learn new things with his neighbor. Our society has passed that stage of existence when a mere bubble would topple it over. It is now upon a solid foundation; it is growing not only each day in membership, but each day in usefulness. We have given three fruit fairs annually, each one not only a grand success, but the last one attracted the attention of the officials of the Department of Agriculture in Washington—the State of Missouri and the State of Arkansas, each of which had a representative present. I am happy to say the fruit industry has grown over four-fold in our section of the country in the past twelve months, and large commercial orchards are now being planted all along the line of the Memphis route from Springfield, Mo., to Black Rock, in Arkansas.

The little society we now claim as our charge will in a few years grasp within its fold the owners of many thousand acres of fruit lands and orchards.

I cannot close without saying that the prospect for a larger display of both fruits and vegetables, that will be supported by over five counties for next year, is very flattering.

Our society is entirely free from debt and money in the treasury to meet all urgent demands. We are growing each year in size, as well as influence.

Respectfully yours,

P. P. B. HYNSON,

Vice-President.

HOLT COUNTY.

HORTICULTURE OF HOLT COUNTY.

Forty years ago when I came to Holt county there were very few bearing apple orchards in the county, and no cultivated or tame small fruits or stone fruits, except a few sour Morello cherries and some seedling peaches.

Some people would set out small family orchards without fencing, and turn the stock in the field and let them destroy the trees, and many were destroyed in this way when large enough to bear fruit. About 37 years ago I wanted some shade trees in my door-yard, and I asked Josiah Springer to bring me some shade trees for that purpose, and he said he would bring me some apple-trees for ten cents a tree, and he did so, and they looked like they were six or seven years old, very tall but healthy—and seedlings of course—do not think there was a grafted nursery in the county at this time. The trees grew a year or two, and thinking I might as well have some fruit, I had them budded, putting in four buds in the body five or six feet from the ground. This was about the middle of the tree. I cut out the top a little at a time for several years, until I cut away entirely the stem above where the buds were put. This I done so neat and careful that they all lived and bore fruit, some of them are alive and in good health today. Where the buds were put in they look so solid and nurly that I have sometimes wondered if dynamite would burst them.

From 1867 or 1868 to 1881 the apples were hauled to Kansas and Nebraska in wagons, the apple wagons running day and night. In 1882 was the first that were shipped by car-lots to amount to anything—that year there were over 200 car-loads shipped out of the county. From

1891 to 1893, from some climatic causes, the apple crop has been almost an entire failure, and other fruits were short in some localities. In 1867, I set some Lawden blackberries, they would grow very large canes in summer but freeze in winter, and I never got any berries from them. Next I tried the Kittatinny and gathered but few berries. Next I tried the Snyder which were full of fine berries every year.

There is a much greater demand for fruits of all kinds than a few years ago. Some years ago a Mr. Ferry had three-fourths of an acre of raspberries, and he could not sell them, while now there are many acres of these berries, and the demand has not been filled for several years. Besides a great many acres of blackberries and strawberries now where there was none then. In 1865 I came in possession of a vineyard of Catawba and Isabella grapes, which were not profitable on account of rotting. Concord done well, and need no racking in this country.

All apple-trees, young and old, are very full of fruit buds which looks promising now for a very large apple crop next year. All trees have made a good growth this summer; the old trees are improving, and there will be many young orchards set out next spring.

George Anderson & Son, sole proprietors of the Oregon Canning Plant of Oregon, Mo., received the gold medal and diploma over all competition for the best canned corn and tomatoes.

This shows that the soil of Holt county, or Missouri, will raise as good quality of sugar-corn and tomatoes as any other state. J. R. Linville is processor for this plant, and they canned a much larger amount than ever before.

The cans that took the gold medal and diploma had no extra attention, but were taken down from the stack.

As horticulture and agriculture are so closely combined, I will give the following:

O. & C. T. Graves, of Maitland, Holt county, Mo., took the premium at the Columbian Exposition for having the best Jersey butter cow on exhibition.

B. O. Cowen, of New Point, Holt county, Mo., also carried away $1125 in premiums on short horn cattle.

N. F. Murray, of Oregon, Holt county, Mo., took premiums on apples, and the Missouri State Horticultural Society received on fruits, 16 medals.

Holt county is close to the front of the State on awards at the World's Fair, and the State of Missouri is the banner State of the Union in awards at the World's Fair, which goes to show that Missouri has as intelligent to enterpsising people as will be found in the Union, if not in the world. She has more votes and more wealth than two or three of those little Eastern states that call her poor old Missouri.

This was no state or county fair, but the World's Fair, where all premiums had to compete with the world, and I think they should be placed so unborn generations can see the enterprise of Missouri at the age 1893.

Missouri was represented in more departments than any other state or territory in the United States, by exhibits, and won many prizes. Missouri took two-thirds of the prizes offered at the World's Fair—sweepstakes on cattle against the competition of the World, and Merino sheep, Berkshire hogs, saddle horses and mules.

In 1822 this prairie country up here was classed as a part of the great American desert, and could never be inhabited, and now, in the short space of 70 years, stands almost, if not quite equal in enterprise, with any place in the world. WM. BRODBECK.

OREGON, MO., Dec. 20, '93.

MR. L. A. GOODMAN:

DEAR SIR—By a postal of October 5, '93, you asked me to tell how or wherein I have failed or succeeded during the past two years. Please allow me to submit the following, considered success by such a practical fruit man as H. E. Van Deman. This is not only a few acres or a few hundred trees, but 437 acres and over 100 trees to the acre.

Now this is much better than any experience I can give of my own, and I believe it is worthy of a place in the State report. As these trees and orchards are just across the Missouri river in Kansas, the same treatment will attain the same results in Missouri.

I am sorry I could not be with you at Fulton. I enjoy these meetings above all else.

Respectfully,

WM. BRODBECK.

SUCCESSFUL FRUIT FARMING.

PROF. H. E. VAN DEMAN.

There are few readers of our horticultural papers who have not heard of the orchards of Wellhouse and Wheat, in Eastern Kansas. Mr. Wellhouse is one of the old substantial, practical fruit-growers of that State, and in 1876 formed a partnership with Mr. Wheat, a lawyer of Leavenworth, who owned farms in Leavenworth and Miami, and had faith in the judgment and ability of Mr. Wellhouse to grow fruit. Mr. Wheat furnished the land and agreed to pay the taxes on it, and also money to buy apple-trees for the first 117 acres planted. Mr. Wellhouse did all the work, and had entire responsibility and oversight of the planting and care of the trees. He sub-rented the land while the trees were small to persons whom he could trust to plow among them, and had nothing but corn planted. He made liberal terms, but bound them to cultivate well about the trees, and gave the matter his personal attention.

The share of corn he recived paid for his trouble and more too. At the end of five years the two contracting parties began to divide the proceeds of the apple orchards, each having half. There were a few more than 50,000 trees planted, but only a part of them on these terms. Those planted after the first 117 acres were set were grafted and grown by by Mr. Wellhouse in the nursery row until two years old.

The method of planting used was to set the trees in rows 32 feet apart east and west and 12 feet apart north and south. This required a few more than 100 to the acre. The purpose in planting close in the rows north and south was that the trees might protect each other by their shade, and yet have plenty of room on two sides. When large enough to crowd, one-half the trees can be cut out, thus leaving them 32 by 24 feet.

In the warm climate of Kansas it is important to have the bodies of the trees shaded, and the same is almost equally true of a large part of the country. The trees were all headed low, which not only served to protect the trunks and large branches from the scorching midday sun and the flat-headed borer, but afforded less opportunity for the sweeping prairie winds to wrench the roots and incline the trees to the northeast than if the trees, had been headed high. When I saw the orchards last, about five years ago, the trees were beautiful in shape, and few of them were branched as high as my waist. Some upright-growing kinds began to branch as low as one foot above the ground. Instead of cutting out the center when young, these trees were trained to have a central stem with branches coming out at intervals in all directions, thus dividing the strain of the heavy crops of fruit. Mr. Wellhouse says that up to this date five-sixths of the fruit is picked from the ground.

Thorough cultivation of the soil was practiced for the first five years and then clover was sown. This was never cut for hay, but a home-made rolling cutter used to mash down all clover and weeds and cut them into pieces, leaving all to act as a mulch and manure. On those rich limestone prairie soils it has not yet been necessary to resort to other means of manuring. The cutter is made from a stick 10 feet long and one foot square, by dressing off the corners, making it octagonal, and inserting a steel blade in each of the eight corners. This simple machine any one can make as cheap or as expensive as may be desired. In those orchards it is used twice in the season—once in July, soon after the clover seed has ripened, and again in September, thus allowing the clover to reseed the ground. My own plan would be to plow the whole ground very shallow every few years. This orchard does not look so neat as those in California, but the clover keeps the soil shaded and cool, which is what apple-roots require. It also has the advantage of cheapness, but any such system will favor the growth of weeds and grasses that often prove serious pests. Mice have proved quite injurious, as the clover and other growth has afforded them cover under which to girdle the trees. Mr. Wellhouse was obliged to adopt some means of protecting the orchards from rabbits, which are very plentiful in Kansas, as I have reason to know from many years of sad experience with them in that State. My method has been to wrap the trees, but this has proven very tedious, and not until I adopted a substantial lath protector did this system prove dependable. In my last annual report, made while an official of the U. S. Department of Agriculture, this device is described and illustrated. Mr. Wellhouse decided to catch the rabbits, and made 1700 box-traps. These were set at regular intervals all over the orchards, and proved effectual. Such a trap did not need baiting, for the dark recess of the box was sufficiently tempting, and the curiosity of the rabbit, and the trigger was so set that it would shut the trap by being touched.

It might seem that this was an expensive way to fight the rabbits, but it did not prove so. In the fall the traps were distributed by wagon, and the natural propensity of the rabbits to examine the traps let them in. At first the catch was so great that men and boys would engage to look the traps over every morning for a part of the game secured, which readily sold in market. After a time they would want all that were caught, and when the rabbits became scarce it was necessary to pay small wages to have the traps tended. Altogether, the rabbits about paid for catching them.

Spraying for insect enemies of almost all kinds has been promptly and systematically followed in these orchards. Leaf-eating insects of all kinds have been effectually destroyed by arsenical preparations; and the Codling moth, which is the worst insect enemy, has been kept somewhat in check by the same means.

The varieties planted were Ben Davis, Jonathan, Winesap, Missouri (Pippin), Maiden Blush and Cooper Early. Missouri has up to this date paid the best, as it is an early bearer, and yielded the most per tree. But the trees are failing and the fruit getting smaller, as is the case in my own and many other orchards I have examined in the West. The same is true of Winesap, although it comes next in point of profit so far. Ben Davis has yielded the third best, but the trees are in good condition and give promise of paying the best in the end. Jonathan, in point of yield per tree, comes fourth because of the fruit bringing from 25 cents to $1 more per barrel than any other kind grown, and the trees yet in good condition for bearing, it should rank equal with any. No apple during many years has brought so high a price in St. Louis market as Jonathan, and to orchardists in the Central States, where the tree will succeed I would recommend it highly.

Maiden Blush has done only fairly and Cooper Early the poorest. In fact, no summer or fall apple will usually repay for planting, except for home use. I came to this conclusion twenty-five years ago, and have rarely seen any cases that would tend toward a change of mind. The fruit is gathered in common two-bushel sacks, with a hoop in the mouth, and tied together as one sowing grain by hand. These, when partly filled by the pickers, who carry them slung over the shoulder, are emptied into shallow boxes on a wagon near by. These are carried to a packing-house, where the sorting is done directly from them. Formerly another system of sorting the fruit on movable platforms in the orchard was used, but that just described has proved the most economical of time. The same plan is followed in handling peaches at the Olden farm, mentioned last month, except that half-bushel baskets are used instead of boxes, and the fruit gathered directly into the baskets. In either case, both hands are free. Peaches will not endure even the gentle emptying from sack to box that in nowise injures apples. A stout hook and eye are sewed to either end of the sack to facilitate emptying it and again fastening the ends together.

Two marketable grades were put in barrels and shipped principally to Denver, Colo. But the last two crops were sent east, some as far as Philadelphia and Baltimore. In 1891 Western New York was partly supplied from these Kansas orchards. This is indeed bearding the lion in his den, but he was hungry and glad to get Kansas Ben Davis when New York Baldwin failed. Exclusive of the cost of land and rent for the same, it cost about 35 cents per tree to bring them to bearing age, or six years from setting. Up to 1890 there had been gathered 230,185 bushels, which sold for $125,118.08. The cost of gathering and marketing was $44,734.30, which leaves as net proceeds the sum of $80,380.78, which is by no means a bad showing for 437 acres of ordinary prairie land, worth not to exceed $20 per acre, and the time of two men (Mr. Wellhouse had a son with him) for the greater part of about 16 years. At least, Mr. Wellhouse is so well satisfied and financially advanced that he has recently put out 800 acres more in apple-trees in Osage county, Kansas. He is trying some other varieties than those mentioned, and his experience has taught him other lessons that will no doubt make his second venture, in connection with his son, only more profitable. It is a pleasure to see such a good, level-headed and faithful fruit-grower succeed.

OREGON, MO., Dec. 4, 1893.

Mr. L. A. GOODMAN, Secretary:

DEAR SIR—Enclosed find the description of an apple from Mr. Van Buskirk's orchard. From the description it is worthy of notice and a name, as he knows no name for it, will you please have this apple named at the Fulton meeting? Considering the age of the tree, living through all the climate changes that injured all our trees of that age very much, and it is still a good bearer, and had a fair crop, while all the other varieties were a total failure, I think this apple is worthy of propagating, and should be attended to before it is lost, as it is the only tree I know of or ever heard of that the apple would cook from the first of August to the last of March. Does not this beat the Ben Davis? It is a much better apple. Mr. Van B. says these I send you are not as large and fine as they had used from this tree. The tree was brought from New York in 1857.

Respectfully,
WM. BRODBECK.

I send today a box of four of these apples.

OREGON MO., Dec. 4, 1893.

WM. BRODBECK:

DEAR SIR—The description of the apple you desire me to give is: I raised a crop in 1890; commenced using them about the first of August, 1890, for cooking, and continued using them until the last of March, 1891. At the district fair at St. Joseph Mo., I put a plate of five apples which, at an exhibit of about 2000 of all the different varieties, my plate took the award. It is a fine eating apple from early fall until the March following. The tree on which they grew was set out in the year 1857, and is still a good bearer. This year the fruit was not so large as usual, though there was a fair crop; used what we needed in my family, dried about one-half bushel (for which it is excellent), made apple-butter for three families, and have now about one bushel in good condition. It is an excellent bearer.

Yours etc.,
E. VAN BUSKIRK.

DESCRIPTION OF APPLE.

Fruit medium to large; rather roundish-oblong. Color, yellowish, striped with red very closely; dots green and gray, quite prominent; stalk medium to short; cavity large, deep, russeted, and stalk set deeply; calyx closed; basin medium, regular; flesh yellowish, tender, sub-acid; core small, closed.

CONWAY HORTICULTURAL SOCIETY.

CONWAY, MO., Dec. 6, 1893.

The Conway Horticultural Society was organized April 30, 1892, with the assistance of A. Nelson, of Lebanon, and since its orgrnization has held many interesting and profitable meetings.

The following are some of the questions which have been discussed, viz.: pruning, twig-blight, the care of strawberries, the choice of apple-trees, and kinds of trees to plant. Several of our members have large and thrifty orchards, and many trees and plants are being set out each year.

We have a full set of officers, and although our attendance is not what might be desired, we are in good working order and we feel that our labor has not been in vain.

The fruit crop in this vicinity being so near a failure last year was a drawback to our Society; but we have reason to hope for an increase in membership and work.

Much credit is due to our president, W. H. Gelly, for the untiring energy with which he has labored to build up the Society, and for the practical information he has given us.

We regret that none of our members were able to attend the meeting of the State Society at Fulton.

By order of the Society.

R. O. Hardy, Secretary.

SOILS AND FERTILIZERS,

DR. PAUL SCHWEITZER, COLUMBIA, MO.

Mr. President, Ladies and Gentlemen:

The passing of a fertilizer inspection law by the General Assembly of the State of Missouri, was intended to afford protection to the farmer against attempted frauds on the part of manufacturers or dealers in fertilizers, and is a beginning in the right direction. The law is imperfect, however, and needs amendment, which it will doubtless receive at the proper time. Its very passage is an indication of growing interest by progressive farmers in manures and fertilizers, as the best means for increasing soil fertility, and for obtaining larger crops. To afford correct information on the principles of manuring, upon the knowledge of which success so largely depends, must be my excuse for going somewhat deeper into the matter than perhaps the subject upon which you have invited me to address you warrants. I ask you, therefore, to give me a patient hearing.

THE SOIL.

Formation.—The soil is primarily a product of the disintegration of rocks. Weather and chemical agencies break these down, and the floating power of running water, grinding and pulverizing the material, carries the particles to lower levels. There the broadening of the streams checks the velocity of the current, and the material, so far buoyed up and carried along by the moving water, subsides and forms land. This grows by accretion from year to year, until it pushes through the water, where occasional overflows add to its height, until it escapes eventually even these, and becomes the fit abode of man.

In this way most of the soils of our State have originated. The process still continues, and hundreds of thousands of tons of valuable material are carried yearly by the turbid floods of the Mississippi and its tributaries to the ocean, there to build at some future time a continent to be the seat of an empire like our own. The fine material in the process of transportation is naturally carried further than the coarse, the proportion between the two being determined by the nature of the rock from which it is derived, the length of time and character of the atmospheric agencies working upon it, and the velocity of the water rolling and pushing it along. The great variety existing in all these conditions produces, of course, a great variety of soils. In our own State, the fine clay-like material that covers so large an area of it bespeaks a remote source north of the great lakes. The rocks from which it is derived must have been largely feldspathic, as otherwise such vast quantities of clay and clay-like earth as exist in the Mississippi valley could not have been produced; but all rocks containing feldspar, no matter what their structure and origin, contain, besides what will eventually be clay, potash and phosphoric acid, the two elements without which no agriculture is possible.

How vast the quantities of these substances in our soils are, will appear further on; but as both of them, as mentioned, are soluble, they would be washed away by the rains and carried into the ocean if, in the disintegration of the original rock, combinations of them did not exist or were formed, that prevented this leaching process. These combinations, while yielding up to the growing plants from year to year a certain amount from their stores, thereby rendering continuous growth possible, are yet in their totality preventive of waste, and retain enough of these most valuable ingredients of a soil to preserve to it a moderate degree of fertility for hundreds of years to come.

Alteration.—Upon this soil of a purely mineral character plants begin to grow: First, lichens and plants of simple structure and low organization, which, in time, die and make room for others, leaving behind their bodies. Then, as the soil becomes richer in carbonaceous and organic matters, higher organized plants occupy it, passing through the same phases of life as the former, and enriching it at an increased rate by the greater number as well as the greater bulk of their bodies that fall victims to organic law. Lastly, the highest type of plants makes its appearance, preparing and leaving in the course of time the soil in the condition of virgin fertility in which our forefathers found it, and of which, through ignorance of the laws of vegetable growth, they speedily despoiled it.

But the bodies of plants, becoming incorporated in the soil, are not the only causes of alterations which it undergoes by their growth. Many other factors are active in changing a purely mineral to a fertile agricultural soil. The roots penetrate it in all directions, and often to a great depth, leaving after the death of the plant a network of narow channels, through which air and water with their concomitant actions, aided by heat and frost, work a change in the character of the soil that is helped along by the roots themselves, which by their acid secretions attack and dissolve mineral matter previously insoluble. This enters the plant, subserving the physiological processes of its development, and returns at its death to the soil from which it was originally taken, but in altered forms, in combinations not previously existing, more soluble, and therefore more readily accessible to subsequent plants that may need it.

How considerable this factor is even for a single season in modifying the character of a soil will appear further on ; and be it remembered, it is not only the carbonaceous matter of the plant, not only its altered mineral combinations that produce the change, but also the nitrogen, originally absent from the purely mineral soil, and collected successively from the atmosphere, that works a modification in a most important direction. Heat and cold, dryness and moisture, chemical action of the roots of the plants upon the minerals of the soil, and the incorporation into it of their bodies, with their multiform proximate components, including their nitrogenous constituents, and air with its oxygen and carbonic acid, bring about finally a result as beneficial to us as it is natural, and one, withal, that is lasting if knowledge and prudence recognize and deal with it in the proper manner.

Composition.—The soil, then, as it results by the processes indicated, is a mixture of fine and coarse material mixed with a greater or smaller amount of organic humus-like substance, holding a variable but large quantity of moisture in its composition. The percentage of this organic matter is usually low, amounting in our soils rarely to more than 10 in 100, but being more frequently only 4 to 5. The water reaches a higher figure, and though 15 per cent in a soil will support a ripening crop, double the amount is preferable in the early season, and more for a time advantageous rather than otherwise. The nitrogen, though the accumulation of ages, is but a fraction of one per cent, and the average composition of our soils during the summer season is as follows :

4.0 p. c. organic matter.
0.1 p. c. nitrogen.
20.0 p. c. water.
75.9 p. c. mineral matter.

The mineral matter is the matter derived from the rocks that originated the soil, modified, as suggested, by the action of weather and the growth of plants. It consists of particles of quartz sand, feldspar, mica, and a variety of mineral species, easily recognized under the microscope, and, in addition, of clay, soluble silica, simple and double hydrous silicates, the result of the alteration of soil and the addition to it of the ash constituents of the plants that grew upon it. These latter, the hydrous double silicates, are of the utmost importance to the fertility of the soil, as in them really resides the power of holding and storing up for future use the substances for the lack of which a soil is wholly sterile.

In all discussions of agricultural problems relating to mineral fertilizers, but three substances need be considered: Potash, phosphoric acid and available nitrogen. Our soils, as a result of careful investigation, published in bulletin No. 5 of the Missouri Experiment Station, contain, when perfectly dry (dust-dry, *i. e.*, with about 2.5 % of water), the following amounts of these in pounds to the acre:

One acre contains in pounds in

	a.	*b.*	*c.*	*d.*
Water	79497	97980	166980	181500
Potash	60853	59653	50094	21054
Phosphoric acid	2541	2662	2178	726
Nitrogen	4840	2299	726	not determined
Carbon	58927	27709	15972	

a. First 10 inches. *b.* Second 10 inches.

c. At depth of 3 feet in 10 inches. *d.* At depth of 12 feet in 10 inches.

One cubic foot of air-dried soil weighs about 100 pounds, and will retain, when moistened, from 35 to 60—even 80—pounds of water.

It is seen vast quantities of plant-food are stored up in our soils, which if judged by chemical analysis alone would have to be pronounced as extremely fertile; yet it is well known that their fertility at the present day is but moderate, and certainly much less than it was 50 or 30 or even 20 years ago, and that chemistry as a means for estimating the quality of a soil must tell us more than merely its composition. This is owing to certain properties of the soil regarding the absorption of plant-food, and the manner in which plants derive from it their essential mineral constituents.

Properties.—When it was first discovered that chemical analysis was not in every instance a trustworthy guide by which to judge the fertility of the soil, the search for the causes of this apparently exceptional conduct soon made it clear that the greater or less solubility of the potash and phosphoric acid compounds of the soil must contain the key to the solution of the difficulty; for it stands to reason that such compounds, if perfectly insoluble, could furnish to a plant no nutriment whatever, and might as well be looked upon as altogether absent. It is, therefore, not so much the *existence* of potash and phosphoric acid in the soil, but the *manner* in which it exists, or as it is sometimes called, its assimilable form, that renders the latter productive. If chemistry by a mere soil analysis cannot enlighten the farmer about the fertility of his land, a solution of the soil by leaching it out with water and analyzing it might be supposed to furnish the desired information. But the result proved otherwise and just as unsatisfactory as a complete soil analysis, and for the reason, as finally ascertained by numerous and laborious investigations, that soil possesses the property of retaining and holding back these valuable constituents, so that percolating water cannot remove them, while at the same time they are sufficiently soluble to be taken up and appropriated by the roots of the growing plant.

The property of the soil, then, which prevents on the one hand the deterioration of our fertile lands by the washing away by rain and in drain waters of their valuable constituents, lends itself on the other hand to their fixation and retention when given in the form of soluble mineral fertilizer. Soluble potash and phosphoric acid worked into a soil remain there, not to be washed away by rains; they are held as in a bank which honors the legitimate drafts of the plants made through their roots, but refuses payment to the demands of the never-resting and ever-dissipating moving water.

The large quantities of potash and phosphoric acid in our soils are therefore valuable, but insoluble at present to a large extent; their value is hypothecated to the future. By their gradual conversion through atmospheric and other agencies of insoluble into soluble compounds, they furnish a steady though limited supply of plant food for a moderate crop; but the demands of modern agriculture for large and salable annual harvests, sufficient to yield a satisfactory return over and above their cost of production, is not responded to. True, improved methods of cultivation will insure better returns, but only up to a certain point, beyond which artificial (*i. e.*, mineral) fertilizers become a necessity. The readily available plant-food, the accumulation of centuries, has been gleaned by our forefathers of their fertile acres; to us the choice is left of having time unlock similar treasures yet in our soil, and in the meantime quit harvesting, or to supply the deficiencies by becoming buyers, with the certainty of becoming to a much larger extent sellers of our prodcts.

THE PLANT.

Every plant, as also every part of it, leaves on burning a certain amount of ash. This incombustible material represents the mineral constituents of the plant's body, and is different in amount as well as in composition, not only for different species of plants, but also for different individuals of the same species. Oats or wheat, or, in fact, any other cultivated or uncultivated crop, yields results in this direction that vary between widely distant limits, and appear to depend to a high degree on the condition of soil and season. Confusing as were these results, two facts have been established beyond any question of doubt: First, that the plant derives its ash constituents from the soil; and second, that a certain amount of each of about 13 substances is so absolutely necessary to its development that complete absence of any one of them not only checks but actually prevents growth. Potash, phosphoric acid and nitrogen in available form are the only three, however, that need consideration, as the other 10 are never wanting in an arable soil, and discussion of them can lead to no practical result.

Potash, phosphoric acid and available nitrogen—that is, nitrogen in the form nitrate—enter the plant through the roots and from the soil, and as these substances are intimately connected with the production within the plant of the two great classes of foods on account of which we carry on agriculture, viz., starch and proteids, it is plain that greater quantities of the former in the soil will mean greater production of the latter in the plant; and since cultivated differ from uncultivated plants mainly in being richer in starch and protein, it follows that the removal of cultivated crops deprives land of a greater proportion of these valuable mineral constituents than does the gathering and removal of plants that were the natural growth. Increasing of one's crop, therefore, means plainly, first increasing of the plant food in the soil; the one depends upon the other, and to expect continuous and large crops of any kind from land inherited or bought by its cultivator is as reasonable as to expect continued payment of checks on the strength of the deposit that at some former time had been made in a bank. In both cases the drafts upon the available resources, as a means of continued profitable business relations, must be made good; fertilizer must be put upon the land and money placed in the bank.

It may, then, be taken for granted that potash, phosphoric acid and nitrates in the soil in certain amounts are necessary to insure satisfactory crops, and that they must be in soluble—that is, available—form to become active. The large quantities of the two former that have been mentioned before as existing in our soils are, however, soluble only to a limited extent, and though certainly valuable, they are not sufficiently and immediately available for the demands of a large crop; for such a one additional and proper fertilizing material must be supplied regularly and intelligently. This necessity is emphasized by the fact that plants absorb the greater share of these mineral matters during the early stages of their growth, and do so in a special and peculiar manner.

This truth has, in fact, a most important bearing upon the whole question of manuring; for it is plain that if the absorption of the larger part of the ash constituents takes place during early growth and be- full development of the root, system a much larger amount of soluble plant-food must be present in the soil than merely suffices for a single crop, because it has to be where the roots are, and these have not penetrated yet and spread through the whole mass of cultivated soil. The food must seek the roots rather than the roots the food, and stinting the plant at this early stage of growth is fatal to its full development and a sure way to a short crop. Abundance of plant-food at the beginning is prudent husbandry at the end—a truth which becomes plainer yet when we examine the mechanism of root absorption.

The soluble plant-food, which we have called available, forms no real solution, in fact, as the term solution is usually understood. To be sure, we can grow plants in water alone, but to do so requires unusual skill and constant attention to a multitude of minor details, which renders the growing in this manner of our cultivated plants a practical impossibility. All such plants require air in the soil as well as above it, and would speedily perish if their roots remained for any length of time in a water-logged medium, be this filled with water alone or a solution of plant-food of the proper concentration. The nutritive solution, which is meant whenever the name is used in this connection, is a solution of about one part of nutritive substance in a thousand parts of water, moistening every particle of earth with a film of liquid ready to be sucked up by the tender roots of the plant as soon as they touch it, but yet leaving the earth as a whole moist, it is true, but filled with abundance of circulating air, and certainly free from any visible or running water. With such a solution and under such conditions, absorption, assimilation and growth occurs—vigorous, normal and healthy growth. That such such growth implies also greater power to resist disease and recover from injury is to be presumed, and represents a quality in the plants of our crops which, in the light of tremendous losses from fungus diseases and depredations of insects, cannot be valued too highly. On the other hand we must suppose, however, that plants may imbibe, at times, greater quantities of mineral matters than they actually need for their development, just as animals often swallow amounts of food much in excess of their necessities; but the waste is difficult to prevent in both instances, and especially difficult in the case of plants. And what now are the quantities of plant food that are required by our crops? An examination of their weight and composition will give the desired information.

THE CROPS.

In discussing the quantities of mineral matter that are removed by our crops from the soil, it would lead too far here to consider all the plants that are raised by the farmers of our State; a few of the more important ones, which are at the same time typical, must suffice to illustrate the principle, which, once understood and appreciated, could be amplified and applied by every agriculturist.

Many analyses have been made of the ash of plants by this and other experiment stations, which furnish the data upon which the following calculations and deductions rest; they are given, for more ready comprehension, in the form of tables, which deserve close inspection and intelligent interpretation:

Table I:

One hundred pounds dry weight (water free) contain the following amount in pounds of plant-food:

Wheat, kernels:		Timothy:	
Potash	0.63	Potash	1.41
Phosphoric acid	1 05	Phosphoric acid	0.85
Nitrogen	2.05	Nitrogen	1.31
Wheat, straw:		Red Clover:	
Potash	0.69	Potash	2.31
Phosphoric acid	0.28	Phosphoric acid	0.62
Nitrogen	0.61	Nitrogen	2.52
Oats, kernels:		Alfalfa:	
Potash	0.54	Potash	2.35
Phosphoric acid	0.85	Phosphoric acid	0.75
Nitrogen	2.11	Nitrogen	2.74
Oats, straw:		Potatoes:	
Potash	1.12	Potash	2.70
Phosphoric acid	0.28	Phosphoric acid	0.90
Nitrogen	0.70	Nitrogen	1.62
Corn, kernels:		Carrots:	
Potash	0.64	Potash	3.08
Phosphoric acid	0.81	Phosphoric acid	1.06
Nitrogen	1.82	Nitrogen	1.62
Corn, cobs and shucks:		Cabbage:	
Potash	0.71	Potash	5.18
Phosphoric acid	0.04	Phosphoric acid	2.96
Nitrogen	0.49	Nitrogen	4.02
Corn, stover:		Cucumbers:	
Potash	1.34	Potash	5.75
Phosphoric acid	0.03	Phosphoric acid	3.25
Nitrogen	0.92	Nitrogen	3.25

The foregoing table, as the basis, served for the computation of the next; in it the 14 plants or parts of plants were assumed to be in the ordinary condition of merchantable material: that is, material which holds a certain and well-known amount of moisture in its combination. This amount in the case of grain and straw, including all kinds of fairly air-dry hay, was taken to be 10 pounds in 100, and in potatoes, cabbage, carrots and cucumbers as sold in open markets, as respectively 75, 85, 85 and 95 pounds of water to 100 pounds of green weight.

Table 2:

One hundred pounds of marketable produce—that is, wheat, oats, corn, both as grain or straw, and timothy, red clover and alfalfa, as hay, each with 10 per cent of water, and potatoes, carrots, cabbage and cucumbers, each respectively with 75, 85, 85 and 95 per cent of water—contain the following amounts of plant-food in pounds:

Wheat, kernels:		Timothy:	
Potash	0.57	Potash	1.27
Phosphoric acid	0.94	Phosphoric acid	0.76
Nitrogen	1.84	Nitrogen	1.18
Wheat, straw:		Red Clover:	
Potash	0.62	Potash	2.08
Phosphoric acid	0.25	Phosphoric acid	0.56
Nitrogen	0.55	Nitrogen	2.27
Oats, kernels:		Alfalfa:	
Potash	0.49	Potash	2.11
Phosphoric acid	0.76	Phosphoric acid	0.67
Nitrogen	1.90	Nitrogen	2.47
Oats, straw:		Potatoes:	
Potash	1.01	Potash	0.67
Phosphoric acid	0.25	Phosphoric acid	0.22
Nitrogen	0.63	Nitrogen	0.40
Corn, kernels:		Carrots:	
Potash	0.58	Potash	0.46
Phosphoric acid	0.73	Phosphoric acid	0.16
Nitrogen	1.64	Nitrogen	0.24
Corn, cobs and shucks:		Cabbage:	
Potash	0.64	Potash	0.78
Phosphoric acid	0.04	Phosphoric acid	0.44
Nitrogen	0.44	Nitrogen	0.60
Corn, stover:		Cucumbers:	
Potash	1.21	Potash	0.29
Phosphoric acid	0.03	Phosphoric acid	0.16
Nitrogen	0.83	Nitrogen	0.16

To determine what is a fair average crop was a more difficult matter; the values given in table 3 were finally decided upon, omitting those for cucumbers as too widely divergent in different sections of country.

TABLE 3.—Weight of Crop from One Acre of Ground.

Wheat	25 bushels.	Wheat, kernels	1,500 pounds.
Oats	30 "	straw	5,100 "
Corn	60 "	Oats, kernels	960 "
Potatoes	100 "	straw	2,200 "
Carrots	150 "	Corn, kernels	3,360 "
Cabbage	3600 head.	cobs and husks	840 "
		stover	3,000 "
		Timothy hay	4,000 "
		Red clover hay	5,000 "
		Alfalfa hay	4,000 "
		Potatoes	6,000 "
		Carrots	6,000 "
		Cabbage	10,800 "

It is plain now, that knowing the number of pounds of merchantable produce obtained from each acre of land, and also the number of pounds of potash, phosphoric acid and nitrogen which each one hundred pounds of such produce contain, we can readily calculate the total weight of the three substances which exist in the product of an acre; and as this has been derived from the land itself, it is also the weight of the plant-food which each acre loses by such crop.

TABLE 4.—Weight in Pounds of Plant Food Removed from One Acre by these Crops.

Wheat, kernels:		
Potash	8.55	pounds.
Phosphoric acid	14.10	"
Nitrogen	27.60	"
	50.25	"
Wheat, straw:		
Potash	31.62	"
Phosphoric acid	13.75	"
Nitrogen	28.05	"
	122.67	"
WHOLE CROP:		
Potash	40.17	"
Phosphoric acid	26.85	"
Nitrogen	55.65	"
	122.67	"
Oats, kernels:		
Potash	4.70	"
Phosphoric acid	7.30	"
Nitrogen	13.86	"
	20.24	"
Oats, straw:		
Potash	22.22	"
Phosphoric acid	5.50	"
Nitrogen	13.86	"
	41.58	"
WHOLE CROP:		
Potash	26.92	"
Phosphoric acid	12.80	"
Nitrogen	32.10	"
	71.82	"
Corn, kernels:		
Potash	19.49	"
Phosphoric acid	24.53	"
Nitrogen	55.10	"
	99.12	"
Corn, cobs and husks:		
Potash	5 37	"
Phosphoric acid	0.34	"
Nitrogen	3.70	"
	9.41	"
Corn, stover:		
Potash	36.30	pounds.
Phosphoric acid	0.90	"
Nitrogen	24 90	"
	62.10	"
WHOLE CROP:		
Potash	61.16	"
Phosphoric acid	25.77	"
Nitrogen	83.70	"
	170.63	"
Timothy:		
Potash	50.80	"
Phosphoric acid	30.40	"
Nitrogen	47.20	"
	128.40	"
Red clover:		
Potash	104.00	"
Phosphoric acid	28.00	"
Nitrogen	113.50	"
	245.50	"
Alfalfa:		
Potash	84.40	"
Phosphoric acid	26 80	"
Nitrogen	98.80	"
	210.00	"
Potatoes:		
Potash	40.20	"
Phosphoric acid	13.20	"
Nitrogen	24.00	"
	77.40	"
Carrots:		
Potash	27.60	"
Phosphoric acid	9.60	"
Nitrogen	14.40	"
	51.60	"
Cabbage:		
Potash	84.24	"
Phosphoric acid	47.52	"
Nitrogen	64.80	"
	196.56	"

A comparison of the individual and total weights of the three substances removed from each acre of land brings out interesting facts. Of the regular farm crops, red clover and alfalfa stand foremost in their demands upon the soil; they require more potash, more phosphoric acid and more nitrogen, though a large part of this is derived from the atmosphere, than any other. That they grow upon our lands without manuring as well as they do is proof of the inherent fertility of the latter. Continuous cropping would, of course, be impossible, but that a crop of clover in proper rotation can find more than twice the amount of potash and a little more than the same amount of phosphoric acid in the soil than does a crop of wheat, might at first glance be taken to prove manuring of our land altogether unnecessary; the plant-food is certainly present, and if one crop can find it, why might not another be *made* to do so by proper cultivation? There is some prospect for beneficial results in this direction; but as the powers of the different plants for absorbing mineral matters from the soil are limited by the extent of their root systems, and as in clover and alfalfa this is vastly greater and penetrates far deeper than that of the other cultivated plants, they are enabled to get not only from the upper but also the lower stratum of soil whatever plant-food they require, while other plants are mainly depending upon the former. Facts are stubborn realities and cannot be ignored; override them we may, but not with profit to ourselves; far better to guide and direct them by knowledge and ingenuity into useful and profitable channels.

Corn, timothy and wheat, the three staple crops of our State, stand close together in their demand for phosphoric acid, and, in the order in which they are mentioned, in that for potash, of which they contain in round numbers 60, 50 and 40 pounds to the acre; they would stand, therefore, in need of a potash fertilizer in the order named, while their requirements for phosphoric acid are about equal to and nearly those of alfalfa and clover; in nitrogen, corn, wheat and timothy, requiring 84, 55 and 47 pounds per acre, reveal their dependence upon the most deficient, and consequently the most valuable, of the three plant-foods in our soil; but while all these crops represent a demand upon our soil of the quantities of plant-food mentioned, it must be borne in mind that only corn and cobs and wheat kernels are actually sold, and the stover and straw remain; this makes the selling of timothy off a farm a much more exhausting and unwise practice than that of corn or wheat—supposing, of course, that care be taken of the straw in connection with the manure heap. "A penny saved is a penny earned," must be learned by farmers as by other people, in order to become successful in their life occupations.

Of cabbage, potatoes and carrots, in common with all truck-farm crops, it may be said that they need plenty of fertilizer: Much potash, much phosphoric acid and much nitrogen are demanded by them and will pay; their season of growth is short, their root system meager, and plant-food must abound to utilize the tremendous powers of these plants for absorbing and assimilating it; crops two and three times as great as those assumed may be obtained without difficulty.

The value of plant-food, then, has a double meaning: to the plant, as without it no growth, and that is, no crops are attainable; to the farmer, as at some time he is bound to buy and restore what he takes from his land; he cannot eat his cake and have it still. He would buy of course in open market, and at as low a rate as competition will allow, and when he does he will readily ascertain the value of the number of pounds of the three fertilizing substances which his crops have removed; for evidently that value would be equal to the price which he has to pay for them in the market. Such calculation has been made in the following table, under the term of manurial value:

TABLE 5.—Manurial value of this crop:

The trade value of potash, phosphoric acid and nitrogen, or the price at which each can be bought in open market, is 5½ cents per pound of potash, 5 cents a pound of phosphoric acid, and 17½ cents per pound of nitrogen. At these prices the cost of returning to the land what is moved by the crops would be per acre:

Wheat, kernels	$ 6.00
" straw	7.29
	13.29
Oats, kernels	3.81
" straw	3.92
	7.73
Corn, kernels	11.94
" cobs and husks	0.96
" stover	6.40
	19.30

Timothy	$12.57
Clover	26.98
Alfalfa	23.17
Potatoes	7.07
Carrots	4.52
Cabbage	18.35

To take care, therefore, of straw and all other vegetable refuse and return it to the land in a proper manner, is a matter of great importance; to sell timothy, clover and alfalfa as such, rather than to feed it and sell it as flesh or milk, is bad policy and self-destructive. To value a crop simply by its market price is crude and unscientific. The price which the farmer pays for it is not only its cost of production, but in addition to it, its manurial value, which we have often neglected, and which the conditions of the case begin now to force upon us for serious consideration.

THE MANURES.

Manures, in the narrow sense in which the term is here used, are substances which, when put upon the land, increase its productivity by virtue of the plant-food which they contain. This plant-food is entirely of mineral origin and character, and though carbonaceous or so-called organic matter is very important in modifying the properties of a soil so as to render it better adapted for the support of plants, it is in reality only the mineral matter of the soil which these absorb. Plants, therefore, are manures in themselves, and having once gleaned from the soil and taken up their needed amount of mineral matter, hold it, of necessity, in the condition in which other plants may, without difficulty, absorb it. The bulk of such manure, however, is great, and the handling and hauling of it troublesome and expensive; other forms of it, the so-called mineral or chemical fertilizers, may with advantage take its place, and it is of them that we speak here.

These mineral manures, many brands of which are in the market, are in reality only of three kinds, each containing one of the fertilizing materials that have been mentioned before; all others are made up from these, or are, at least, comparable to them as to price and value. A compound or complete fertilizer is, on the whole, unscientific, and though buying it may save the farmer some thinking, he is charged a good round sum for the thinking which the manufacturer does for him. No one supposes that all of the land of a state, of a county, or even a township, needs the same properties of plant-food in its fertilizers. A complete fertilizer could, therefore, apply only to a perfectly sterile land, and would have to differ with each crop raised on it. On any other it must be wasteful, since, if one ingredient be in excess, it would be left behind and not enter the plant, and if it fell short of the crop's capacities for it, the others would be useless to the extent of their exceeding it. Far better to apply potash, phosphoric acid and nitrogen separately as the needs for each may manifest themselves to the farmer. To be successful in his avocation, he must be able to give the same answer as the painter when questioned as to what he put in his paints to make his picture so true and charming, viz., "brains;" so the farmer must put brains in his soil if he wishes it to respond without waste to its full capabilities, and render his business—for business it is—prosperous.

Before discussing now the individual fertilizers, a summary statement of the quantity of each per acre might be made, as far as the question can be decided on general principles. In table 4 the weights in pounds of the three important fertilizing materials removed per acre by a number of crops are given, and the crops themselves are, certainly, within the reach of our farmers in good years. The crops must, therefore, find this plant-food in the soil, and if larger ones are not harvested on account of the absence of or difficulty in finding additional food supplies, fertilizers would remedy the matter easily. Doubling the crops should be our aim, and to approach it, fertilizers sufficient to provide for the wants of this increase should be put upon the the land. If this be done, a full response must, of course, not be expected the first year; the solubility of the material will spread it throughout the soil, while the roots come in contact only with a limited portion of it; but in the end it is taken up and utilized. Upon this plan a table each for potash, phosphoric acid and nitrogen will be constructed to facilitate the calculation of the farmer.

Potash.—The accessible potash supply for this State consists of wood-ashes and the products of the potash industry at Strassfurt, Germany. The former are limited in amount and available only in certain places, and it is difficult to assign to them, on account of differences in their composition, any certain value; where used as in the southern part of the State, 10 per cent of potash in them may perhaps be a fair average, so that 100 pounds of good, dry wood-ashes would possess a manurial value of 55 cents.

An unlimited supply of potash salts reaches us, however, from Germany. The potash or German Kali works, as officially known here, produce and send out a yearly increasing quantity of their valuabe products, which begin to find their way to our State and to our farms. Mainly four forms are imported, each containing a different but warranted quantity of potash, which may be trusted to be correct without State supervision. The four forms, together with their nominal value at 5½ cents per pound of actual potash, are as follows:

Kainit, with 12.4% of potash, $0.68 100 pounds, $13 60 per ton.
Sulphate of potash, 50% of potash, $2.75 100 pounds, $55 per ton.
Carnallit of potash, 9.0% of potash, $0 49 100 pounds, $9.80 per ton.
Muriate of potash, 45 to 55% of potash, $2.47 to $3.02 100 pounds, $49.40 to $60.60 per ton.

Kainit may be said to be raw material from which sulphate of potash, as carnallit that from which muriate of potash, are made; both raw materials contain, in addition to the potash, magnesium salts and common or table salt, which on our soils are of some value and often prove quite beneficial. The prices at which these salts sell are close to their manurial value, both of which should really be identical, since manurial value means the price at which the specific manurial agent can be bought in open market; but railroad freights and the cost of manufacturing the crude into purer products cause the price to differ from and to usually exceed the value; where the difference is great either way—that is, where the price is much higher or much lower than the manurial value —investigation and caution in buying is called for.

TABLE 6 —Quantities of Fertilizers in pounds per acre to supply a Crop with Potash.

Wheat, $2.21—		Red clover, $5.72—	
402 pounds	wood ashes.	1140 pounds	wood ashes.
446 "	carnallit.	1155 "	carnallit.
324 "	kainit.	840 "	kainit.
80 "	sulphate or muriate.	208 "	sulphate or muriate.
Oats, $1.48—		Potatoes, $2.21—	
269 pounds	wood ashes.	402 pounds	wood ashes.
299 "	carnallit.	447 "	carnallit.
220 "	kainit.	324 "	kainit.
54 "	sulphate or muriate.	80 "	sulphate or muriate.
Corn, $3.37—		Cabbage, $4 63—	
612 pounds	wood ashes.	842 pounds	wood ashes.
679 "	carnallit.	936 "	carnallit.
493 "	kainit.	680 "	kainit.
122 "	sulphate or muriate.	168 "	sulphate or muriate.
Timothy, $2.79—			
508 pounds	wood ashes.		
564 "	carnallit.		
410 "	kainit.		
102 "	sulphate or muriate.		

Phosphoric Acid.—The phosphoric acid supply for fertilizer purposes is more varied than that of potash; its four main sources are: First, bones, either as fresh or spent bone-black; 2d, phosphatic deposits like those of South Carolina or the keys of the Caribbean sea; 3d, accumulations at certain places of fossil, chiefly excrementitious material; 4th, Thomas slag, a by-product, recently brought into market, of the smelting of iron ores. In neither of these materials the phosphoric acid is readily available, and each requires to be ground into an exceedingly fine and impalpable powder, or else to be treated with oil of vitriol to render the phosphoric acid soluble. The first is a simple mechanical process, which makes the product cheaper though less effective than the second, which is a chemical treatment with variable quantities of acid, requiring both knowledge and skill. The prices paid, therefore, per pound of phosphoric acid are in accordance with its degree of solubility, and this, again, depends upon the treatment the raw material has received by the manufacturer; they are about as follows:

Raw material, ground moderately fine, phosphoric acid 2 cents a pound.

Raw material, finely pulverized or floated, phosphoric acid 4 cents a pound.

Superphosphate (raw material treated with acid), phosphoric acid 6 cents a pound.

It is, therefore, not a matter of indifference in what form a phosphatic fertilizer is bought, and careful and frequent analyses of the brands offered for sale are necessary to protect the buyer. Our present state inspection law is defective and does not secure it; no general standard brands like those of the Strassfurt potash salts or the nitrate are accessible to the retail trade, hence the product of the unscrupulous and fraudulent concern stands upon an equality with that of the reputable and honest house—a condition which is unjust to the latter and confusing to the farmer who wishes to buy. No tabulation as to cost and amount per acre of the phosphoric acid in a crop is, for that reason, attempted.

Nitrogen—The term "available," so often used in regard to plant-food, implies solubility in water, since the roots of the plants can suck up and absorb nothing but what is soluble. This applies to potash and phosphoric acid, whose insoluble compounds in the soil are nearly valueless, and is still further limited in the case of nitrogen by additional conditions. Thus the vast amount of elementary nitrogen stored up in our atmosphere is completely unavailable excepting in those special cases to be described later; likewise does the available nitrogen in the soil suffer gradual but continued loss through surface washing or under-drainage, by which this most desirable and costliest of all the plant-food demands more careful and more intelligent attention than the rest.

We know there are virtually but two classes of nitrogen compounds, which, on account of their solubility and the experimental proof furnished therefor, can be taken up and assimilated by the plants; these are ammonia salts and salts of nitric acid; we also know by practical trials with our cultivated crops that the latter are more effective than the former, and are in all probability that form of nitrogen which the plant can most readily utilize; all others can serve the needs of the plants only after conversion into nitrate, which takes time and renders their use much less effective. While therefore not excluding salts of ammonia, such as sulphate or muriate, there is no doubt but that nitrates are preferable and cheaper, and are in reality the rational source of nitrogen supply for our crops, with which we compare all others as to price and efficiency; these others are of two main sources; animal or ground fish, bone, scraps and the multifarious refuse of our slaughter and packing-houses; and vegetable, as f. e. cotton-seed meal and similar articles, whose nitrogen, to repeat it, is not immediately available to plants, but must first pass through a series of changes within the soil into compounds of ammonia, which the plant may take up, but which it finds some difficulty in easily digesting. These changes precede in every instance the assimilation of nitrogen, and since animal substances containing it decompose much more readily than vegetable ones, the former are more valuable to the farmer than the latter for manurial purposes, where quick responses are expected and demanded. From this statement, however, horn shavings and hide and leather scraps must be excluded, as these produce scarcely any effect whatever unless previously subjected to a chemical treatment.

These facts are recognized in the prices at which a pound of nitrogen in different fertilizers can be bought; and as several find a sale only in eastern markets, eastern prices are subjoined here:

Price of One Pound of Nitrogen in the Following Brands:

Ground fish, meat, blood	(containing	8%	nitrogen),	17½	cents	a pound.
Ammonia sulphate,	"	20%	"	17	"	"
Nitrate of soda,	"	15¾%	"	15½	"	"
Fine ground bone and tankage	(containing	6%	nitrogen),	15	cents	a pound.
Fine gr. medium bone and tankage,	"	4%	"	12	"	"
Medium bone and tankage,	"	4%	"	7	"	"

The high, and, in fact, the highest price of all paid for the first article, is owing to the presence of other valuable constituents, and does not invalidate the general statement made above. Peruvian guano would in all probability rank alongside of it, and for similar reasons.

The soil, then, is the medium in which the conversion of any form of nitrogenous compounds, whether animal or vegetable, into ammonia, is effected. This is partly absorbed by the plants, partly fixed by the soil, and partly, also, if opportunity offers, carried away by running water. The action of the soil, however, does not stop here. Multitudes of living and active organisms, constantly present in it, transform with great rapidity the ammonia into nitrate, in which form cultivated crops greedily absorb and convert it to their uses, so that the choice of a nitrogenous fertilizer, whether organic, ammonia, or nitrate, depends simply upon the time when it is expected to be of service to the crop. If immediately, then nitrate; if subsequently, with the chance of failure to come to time, and during the interval to suffer loss by washing away, then ammonia or organic manures. The rational nitrogenous fertilizers, and all things considered the cheapest for extensive agriculture, are certainly the nitrates, of which nature has given us vast deposits in some parts of our globe.

The amounts in pounds of the various fertilizers per acre necessary to furnish the nitrogen of a crop have been calculated, and as the price of this differs, as already stated, in proportion to its availability, the cost has been added:

TABLE 7—Pounds and cost of fertilizer per acre to supply a crop with nitrogen.

Wheat—55.65 pounds of nitrogen:		
700 pounds	ground fish (8% of nitrogen)	$9 74
278 "	sulphate of ammonia (20% of nitrogen)	9 46
354 "	*nitrate of soda* (15¾% of nitrogen)	8 63
938 "	fine ground bone and tankage (6% of nitrogen)	8 35
1391 "	fine ground medium bone and tankage (4% of nitrogen)	6 68
1391 "	medium bone and tankage (4% of nitrogen)	3 89
Oats—32.10 pounds of nitrogen:		
400 pounds	ground fish	5 62
160 "	sulphate of ammonia	5 46
204 "	*nitrate of soda*	4 97
535 "	fine ground bone and tankage	4 81
802 "	fine ground medium bone and tankage	3 85
802 "	medium bone and tankage	2 25
Corn—83.70 pounds of nitrogen:		
1040 pounds	ground fish	14 65
419 "	sulphate of ammonia	14 23
532 "	*nitrate of soda*	12 97
1395 "	fine ground bone and tankage	12 55
2092 "	fine ground medium bone and tankage	10 44
2092 "	medium bone and tankage	5 86
Timothy—47.20 pounds of nitrogen:		
590 pounds	ground fish	8 26
236 "	sulphate of ammonia	8 02
300 "	*nitrate of soda*	7 32
787 "	fine ground bone and tankage	7 08
1180 "	fine ground medium bone and tankage	5 66
1180 "	medium bone and tankage	3 30
Potatoes—24 pounds of nitrogen:		
300 pounds	ground fish	4 20
120 "	sulphate of ammonia	4 08
152 "	*nitrate of soda*	3 72
400 "	fine ground bone and tankage	3 60
600 "	fine medium bone and tankage	2 88
600 "	medium bone and tankage	1 68
Cabbage—64.8 pounds of nitrogen:		
810 pounds	ground fish	11 34
324 "	sulphate of ammonia	11 02
412 "	*nitrate of soda*	10 04
1080 "	fine ground bone and tankage	9 72
1620 "	fine ground medium bone and tankage	7 78
1620 "	medium bone and tankage	4 54

GREEN MANURING.

It is proper here to explain the principles of green manuring, since they bear in an important manner upon the nitrogen question, and are in explanation of some of the statements just made; the practice itself is old, and has been followed with varying degrees of success for hundreds of years. To incorporate great masses of vegetable matter into a soil increases its water-holding power, makes it more porous and richer in humus, and imparts to it certain physical properties which are highly beneficial to plant life and the growth of crops; but the quantity of mineral matter in it is thereby not in the least affected; whatever amounts f. e. of potash and phosphoric acid a crop may contain, and by plowing under, yield up to the soil, it is plain that it merely returned what it borrowed, and no art in manipulation can alter the fact.

The two bodies, however, have certainly become, by green manuring, more available to plants than they were before; but the same thing might have been effected by plowing and cultivating the land without any crop, and even, though in a minor degree, by permitting it to lie fallow for a season; so that the practice could scarcely be either wise or profitable, were it not for the power, formerly suspected and now known to exist in certain plants, of fixing the elementary nitrogen of the air and converting it to their uses. This power the great majority of our cultivated plants lack. They need and depend upon nitrogenous manures for their nitrogen supply, and require of the farmer either watchful care in saving and utilizing all vegetable and animal refuse of the farm, or the purchase of chemical fertilizers in open market.

We distinguish thus between two classes of plants: The nitrogen consumers just now described, and the nitrogen producers, possessing the economically most important property of being able to live upon the nitrogen of the air; they produce not nitrogen, not something that did not exist before; but they convert the non-serviceable free nitrogen of the air into serviceable combined nitrogen of plant and soil. All nitrogen producers so far discovered are leguminous plants, and it is probable that every member of this family possesses this power. Peas, beans, vetches, clover, serradella and lupines have in turn been the objects of experimentation, and while much yet remains to be explained, the following facts are definitely known:

1. The power of leguminous plants to assimilate atmospheric nitrogen depends upon their roots showing numerous, irregular, small swellings called tubercles.

2. The tubercles are caused by minute living organisms, existing in great numbers in the soil. (They are different from the bacteria spoken of before as the cause of the conversion of nitrogenous substances into nitrates.)

3. Leguminous plants grow in a sterilized soil: that is, a soil in which these organisms have been destroyed; like all other plants, they demand assimilable nitrogen as f. e. nitrates.

4. A sterilized soil in which leguminous plants are grown by the aid of nitrates, and in which they would perish if these were cut off, may acquire the power of producing in them root tubercles by coming in contact with a minute portion of earth possessing it, or with water, even only a few drops, that had percolated it; the plants then become able to live without nitrates and upon the free nitrogen of the air.

This living together of the leguminous plant, and the adventitious organism for mutual benefit, is frequently met with in the vegetable kingdom, and is called *symbiosis.* It is a purely business relation, and when either host or visitor overtakes and crowds out the other, the death of both results speedily. The organism, it is to be presumed, demands for its development the existence within the host of certain favorable conditions, which doubtless prevail in all leguminous plants, and impart to them their important property of being able to live on free nitrogen. May not other plants be made to acquire it also? Until then, we have learned, however, which crops may and which may not be employed for purposes of green manuring; the knowledge must now be supplemented by actual trial to render it practical. Whether clover, peas and vetches, serradella or lupines answer best under our conditions of soil and climate; whether to grow them as main crops and lose the use of the land for the season, or to sow with others and secure a crop along with a long period of growth; whether to plow in at all or feed to cattle and save the manure to return to the land; and lastly, whether to buy mineral fertilizers to stimulate an abundant growth of leguminous crops for feeding, followed by a grain crop or a crop of roots or tubers for two or three years to begin the rotation again, are all questions that practical and patient trial alone will answer; and such answer in the form of a few plain rules is the hope of agriculture, and, when formulated, the staff upon which the general farmer will lean with safety.

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